

Mining

CONGRESS JOURNAL



NOVEMBER
1953



Report on AMC Seattle Convention

TOTAL ENGINEERING

It's one reason why **LINK-BELT** gives you better belt conveyors



Wet phosphate rock is transferred to Link-Belt collecting belt conveyor by thirteen Link-Belt belt feeder-conveyors under the storage bins. Eleven of the feeder-conveyors are reversible.

WHETHER your handling requirements are simple or complex, you'll find the right answer at Link-Belt. For Link-Belt Belt Conveyors are "totally-engineered." That means every component is matched to the exact needs of the job. And the Link-Belt engineering organization will follow through from start to finish—in the designing, manufacture and erection of all your conveying equipment.

Get all the facts from the Link-Belt office near you. Link-Belt engineers—working with you and your own staff—will help you get the finest in belt conveyors.

LINK-BELT
Belt Conveyor Equipment

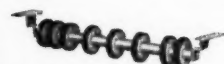
LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Scarboro, Toronto and Elmira, Ont. (Canada); Springs (South Africa); Sydney (Australia). Sales Offices in Principal Cities.

LINK-BELT builds a complete line of belt conveyor components

**ALL TYPES OF
ROLLER BEARING
IDLERS**



20° troughed idler



Rubber tread return idler



Return idler

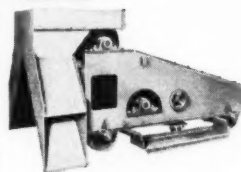


Belt-training idler



Flat-roll idler

**BELT AND
MOTOR PROPELLED
TRIPPERS**



**COMPLETE DRIVES
AND TERMINAL
MACHINERY**



Easier Loading

reason why

AIRDOX

NON-EXPLOSIVE MINING METHOD

is the cheapest means known
for face preparation

The picture above tells its own story!

It shows how the "gentler", heaving action of AIRDOX dislodges coal in firm, large lumps, ready for easier, lower-cost mechanical loading. Notice also the excellent condition of the roof structure and face.

Important as it is, this is just part of the savings effected with AIRDOX. In mine after mine, it has also been proven that . . .

- The actual cost of dislodging coal is less with AIRDOX in practically every case.
- AND, because AIRDOX produces less fines, it reduces cleaning costs.

Our engineers are ready to show you, with facts and figures, the economies you can expect with AIRDOX in your mine.
WRITE AND WE'LL ARRANGE A FREE SURVEY.

This bank of AIRDOX Compressors provides high-pressure air for dislodging coal in a large mine. Air is distributed through the mine by easily installed tubing.

CARDOX CORPORATION • BELL BUILDING • CHICAGO 1, ILLINOIS

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ALLIS-CHALMERS GRINDING MILLS

SPIRAL LINERS make grinding MORE PROFITABLE

INCREASED CIRCULATING LOAD

... LESS OVERGRINDING ...

Material is kept on the move. Large balls do not overgrind fine particles needlessly. Percentage of circulating load has been *tripled* on several mills equipped with spiral liners!

EFFECTIVE BALL SEGREGATION

Large balls at feed end break large particles of incoming feed. Small balls concentrate at discharge end where they utilize greater ball surface for grinding smaller particles.

SIMPLIFIED FEEDING

Ball charge does not fight incoming feed. Motion imparted to balls and material by spiral liners results in a low level of balls at feed end and a higher level at discharge end.

INCREASED CAPACITY

More material can be put through mill in a given time. Retention time of material in the mill is reduced. Power cost is less — no power is wasted on overgrinding . . . ball segregation increases efficiency.

For application of spiral liners to your grinding mill, call the Allis-Chalmers representative in your area, or write Allis-Chalmers, Milwaukee 1, Wis.

A-4155

ALLIS-

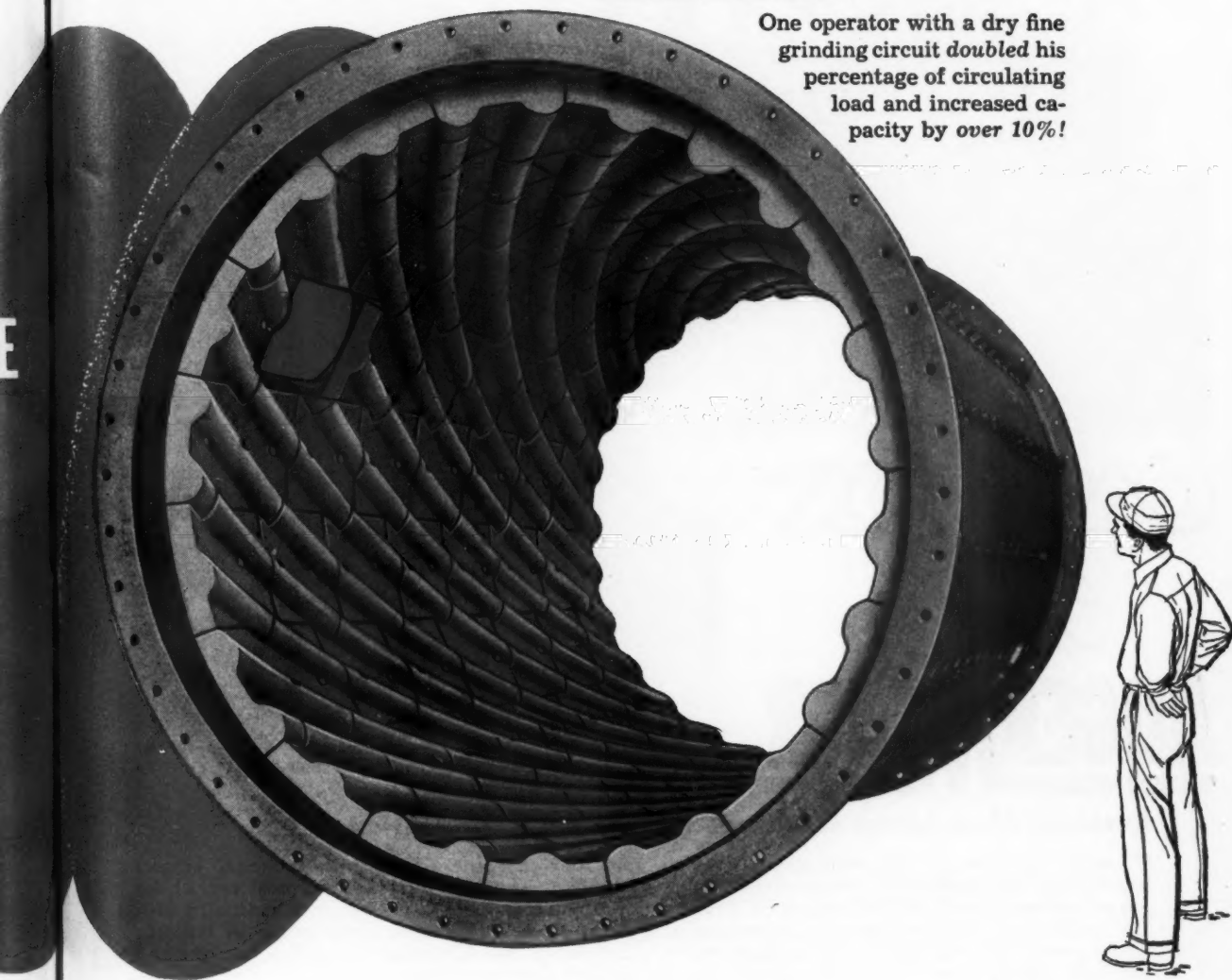
MILWAUKEE 1,

**HERE ARE USER
EXPERIENCES . . .**

One operator with mills in a coarse wet grinding circuit *tripled* his percentage of circulating load with spiral liners.

Another wet grinding mill operator *tripled* circulating load and increased capacity by nearly 10%! Plans at this plant call for spiral liners for all ball mills.

One operator with a dry fine grinding circuit *doubled* his percentage of circulating load and increased capacity by *over 10%*!



CHALMERS

WISCONSIN



when ***Overburden***
squeezes the profits out of stripping . . .



CARDOX
Surface
AUGER MINER



CARDOX Surface AugerMiner teams up with mechanized loading for fast, lower-cost coal production.

Restores Abandoned Workings to Profitable Production

When excessive overburden puts a stop to conventional stripping, CARDOX Surface AugerMiners put mines back into profitable production. Drilling 100 to 120 feet, they salvage volume tonnage at a cost usually far less than for the original working. This "bonus" tonnage is easy to get.

CARDOX Surface AugerMiners are simply trucked or towed on their detachable wheels to the exposed surface. They are self positioning to the height of the seam. A rugged, 145 H.P. engine drives augers that drill holes up to 38 inches in diameter. AugerMiner coal is *clean* and *free*

of rock or shale — because directional control keeps the auger boring into the best part of the seam. Coal can be loaded mechanically into trucks without further processing. A built-in retriever makes it easy to add or remove the 6-foot auger sections.

If you have a seam where overburden has squeezed the profits out of conventional stripping, you may have abandoned your best paying tonnage! Investigate the CARDOX Surface AugerMiner. See your CARDOX Representative — or write for AugerMiner Bulletin.

CARDOX CORPORATION • BELL BUILDING • CHICAGO 1, ILLINOIS

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Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress

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*Deceased January 12, 1953.

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**Cut both Coal and Costs
with this seasoned**

JEFFREY

70-UR UNIVERSAL CUTTER



Available in 5 Models.

Cutting range — 11" below floor to 13' above.

Minimum tramming height — 30-45 inches.

All are compact, rugged and speedy in operation.

This type of coal cutter is proving itself daily on those operations requiring a machine capable of making a variety of cuts—in a minimum of time—at low cost. Consult a Jeffrey engineer for additional data on this truly universal machine.



A COMPLETELY-HYDRAULIC MACHINE FOR CUTTING ANY PLACE IN THE SEAM

Here's a machine that can make any kind of cut any place in a coal seam. From one position it can make a 30 ft. horizontal cut or make a shearing cut 5'5" either side of center line of machine. Maximum top cutting height of a standard unit is 7'9". However, with a special high-type machine a top cut as high as 13 feet can be made.

All operations are hydraulically actuated (except driving cutter chain). This insures a quick, positive and accurate response — saves time — and results in greater tonnage per man day. Another feature which makes for ease of operation and time saving is the dual control.

Both sides of the 70-UR are identically equipped with controls permitting operator to position himself for either right or left hand cut and still have complete control of all operations at his finger tips.

The Jeffrey 70-UR is mounted on pneumatic tires and equipped with hydraulic steering. It can be maneuvered with exceptional ease regardless of floor conditions. The wide wheel gauge, adequate wheelbase and low center of gravity combine to give excellent stability and equilibrium even when operating at extreme reach.

We will be glad to tell you more.



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... IT'S A JOB FOR JEFFREY!**

BUCYRUS-ERIE Announces the **180-W**



■ ■ ■ A NEW 5 CU. YD. WALKING DRAGLINE

**Combining Big Output Capacity And Long
Working Reach With Unusual Portability**

Diesel or Ward Leonard Electric

THIS NEW Model 180-W offers the operating features that have proved so successful in many years of actual field performance by the outstanding line of Bucyrus-Erie walking draglines. In addition, it offers exceptional shipping and erecting ease for a machine so large — only partial disassembly necessary for moving from one stripping job to another. This means substantial savings in moving time and expense, as well as increased machine value throughout its entire life.

- Big output capacity from fast cycle, quick moves, steady all-weather performance.
- Long reach where needed — with 5-yd. bucket the 180-W will move material 244 ft. in a 180 degree swing.
- Knocks down into large sections for easy moving and erecting.
- Easily maneuvered to most effective working position with Bucyrus-Erie's exclusive walking mechanism.
- Large bearing area permits working on soft ground.
- Low maintenance with a minimum of moving parts.
- Simple main machinery.
- All-welded boom with tubular braces for light weight, plenty of strength.

Send for complete information on the 180-W

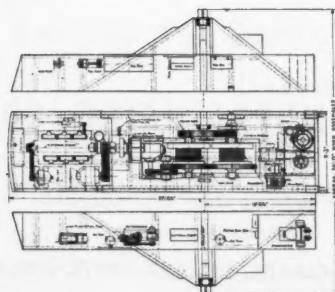
5-yd. bucket with 120 ft. boom

4-yd. bucket with 135 ft. boom

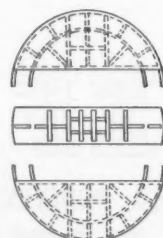
39L53C



BUCYRUS-ERIE COMPANY
SOUTH MILWAUKEE, WISCONSIN



For shipment the side wings unbolt from center section of revolving frame. The main machinery remains fully assembled and in proper alignment. The entire machine is easily loaded on five U.S. railroad cars.



The base is made up of three separate welded-steel sections which are joined in the field by bolting flanges. It is easily disassembled and shipped.



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MAKE SPRAGUE & HENWOOD BITS CUT FASTER—LAST LONGER

Always a leader in its field, Sprague & Henwood, Inc. PIONEERED the development of ORIENTED Diamond Bits; in which each individual diamond is set with its hardest rib or "vector" toward the work.

As of the present date we have produced more than FIVE THOUSAND oriented bits, in a wide variety of types and sizes, with both cast and powdered-metal matrices; and have proved, by extensive comparative tests in our own contract drilling operations, that they cut much faster and last much longer than bits in which the diamonds are set at random.

Only selected diamonds of certain crystalline structure can be used and only specially trained and equipped setters of more than usual aptitude can be relied upon to orient diamonds correctly in the mold, but we are now fully organized for efficient production of CERTIFIED ORIENTED DIAMOND BITS.

In terms of footage cost, these are the most economical diamond bits ever produced and we invite inquiries on that basis. Bulletin No. 320 illustrates and describes all types and gives complete data.

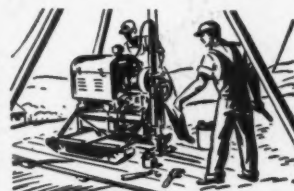


Drilling Machines and Accessory Equipment

To get the full benefit of our new diamond bits you need drilling machines with plenty of power and a wide range of both speed and feed. Model 40-C is our latest-model core-drilling machine and can be relied upon for best possible all-round results on holes up to 1000 feet in depth. Other modern machines provide for very deep core drilling and for either core drilling or blast-hole drilling underground. We also manufacture a complete line of improved accessory equipment. Illustrated bulletins containing detailed information mailed on request.

CONTRACT DRILLING

We do drilling by contract and are one of the oldest and largest contractors for any type of core drilling. Experienced crews and supervisors are available for service anywhere in the United States and many other countries. Estimates on request.



SPRAGUE & HENWOOD, Inc., Scranton 2, Pa.

Branch Offices: New York • Philadelphia • Pittsburgh • Grand Junction, Col. • Buchans, Newfoundland



Track-mounted drill with two booms makes hole-drilling and bolt-tightening swifter than ever. Bolting crews work without delay when O-B shells and plugs are used.



O-B Expansion Shells and Plugs for $\frac{3}{4}$ " bolts and threaded rods.

YOU BUY . . .

Speed

WHEN YOU BUY
O-B SHELLS
AND PLUGS

● That's right! Speedy roof bolt installation goes hand in hand with the use of O-B Expansion Shells and Plugs. They're the shells and plugs that are lubricated. Plug threads are always clean and rust-free, ready for assembly on the roof bolt. Shells and plugs are never rusted together.

O-B shells and plugs are pre-expanded to fit bolt holes without any adjustment, with plenty of spring to hug the wall of any right-size hole. Bolts with O-B shells and plugs tighten every time!

Bolting fits right into the face working cycle when a two-man crew can set six four-foot bolts in 20 minutes! That's the kind of bolting you can do with O-B Expansion Shells and Plugs. Give them a try. You'll buy bolting speed when you buy O-B shells and plugs.



4395-M

Tomorrow's Shovels

FOR TODAY'S MINING

THESE FEATURES ADD UP TO ...

- Bigger dippers per pound of shovel weight
- More output
- Lower operating cost
- Broader application

Bucyrus-Erie's progressive design brings the modern shovel front end to the mining industry.

Only Bucyrus-Erie offers these features in front end equipment on mining shovels.

BOOM — Two section — light upper section, rugged lower section. No excess weight. Weight and strength concentrated where needed and close to center of rotation.

Lower boom section part of main machine, through twin strut connections to A-frame. Boom feet wide spread — no sway braces or cables. No boom jacking.

TYPE OF HOIST — Twin dual, single-part ropes, one attached to each side of dipper. Power automatically concentrated where needed on dipper lip to break through bank obstructions. No dipper bail.

SADDLE BLOCK — Cylindrical. Rubber cushioned against impact during fast plugging of swing. No binding with flexed dipper handles.

HANDLE — Single, tubular, one-piece, can rotate in saddle block. No handle twist possible.

CROWD MACHINERY — Located on revolving frame, close to center of rotation. Position reduces swing inertia. Accessible, protected.

TYPE OF CROWD — Quiet, positive, independent twin rope crowd and retract. Adapts itself to tubular handle rotation — low friction — less crowd power required.

CONVERTIBILITY — Shovels fully convertible to draglines of the independent motor type — no operating clutches or brakes.

There are many more reasons why these modern Bucyrus-Eries are the finest quarry and mine excavators ever built. Get the full story today.

43153C

**BUCYRUS
ERIE**

South Milwaukee
Wisconsin

Lower End "C" Lower End "B" Lower End "A"



Longyear

"L" SERIES DOUBLE TUBE CORE BARRELS

... with interchangeable lower ends



The Choice of Operators for Dependability and Economy

... Cores
Tell
The Story



LOWER END "A"

INTERCHANGEABLE FOR SOLID FORMATIONS
Consists of a split ring core lifter and case, an inner tube extension, and a bit. It is especially adaptable for use with the swivel type core barrel heads in reasonably solid formations.

LOWER END "B"

INTERCHANGEABLE FOR BROKEN FORMATIONS
This is a basket type core lifter, an inner tube extension, and a bit. It should be used only with swivel type core barrel heads. It is the preferred choice for coring clay or badly broken formations.

LOWER END "C"

INTERCHANGEABLE FOR DRY BLOCKING
Designed to assure longer runs in formations where core lifter resistance causes premature blocking. This assembly does not have any core lifter but has a straight wall inner tube shoe extending down to the bit. This is highly recommended when dry blocking is used.

Interchangeable feature assures quick conversion to meet changing field conditions

LARGE SERIES Ball Bearing Swivel Type Double Tube Core Barrels

The large series core barrels are unexcelled for shallow exploration in soft formations, mine drilling, and foundation test boring on embankments, and on slopes and on sites for heavy structures. Let us send you complete details.

The "L" Series of Double Tube Core Barrels has been designed and developed to increase and improve core recovery in ground that is difficult to core with ordinary equipment. These core barrels are especially suitable for use in broken, fissured, porous and easily eroded formations.

This series adds new and desirable features in a design which allows for quick conversion to meet changing field conditions, and which have many proven advantages to the operator. Let Longyear engineers help you select the proper equipment for your needs.

Write today for bulletin containing full details and specifications.

In U.S.A.
E. J. LONGYEAR COMPANY
Minneapolis 2, Minn.

Longyear

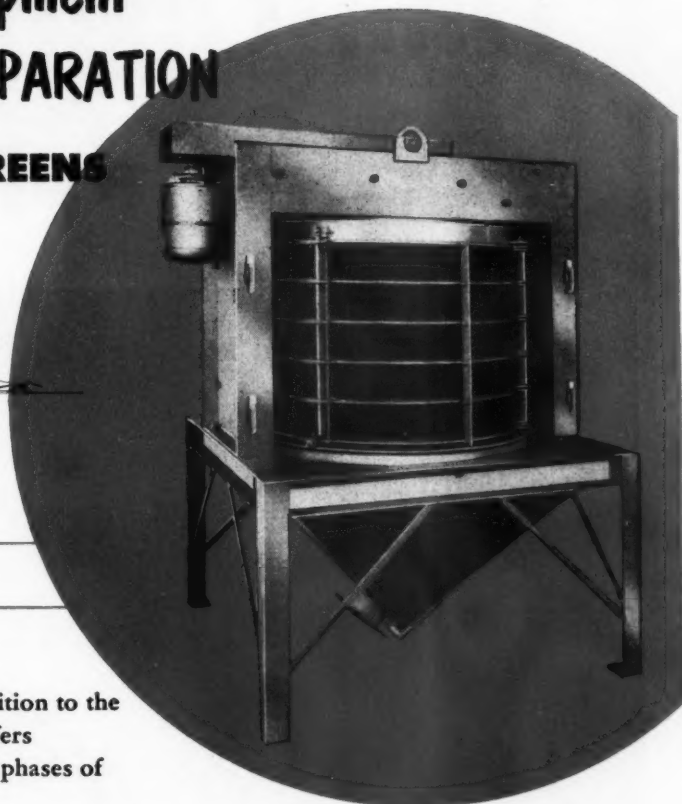
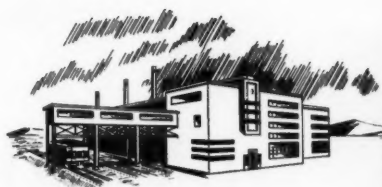
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DIAMOND CORE DRILLS • CONTRACT CORE DRILLING
GEOLOGICAL AND MINING ENGINEERS AND CONSULTANTS

REPRESENTATIVES IN PRINCIPAL MINING CENTRAL OF THE WORLD

A Proven New Development for BETTER COAL PREPARATION

... SYMONS "V" SCREENS



... for SIZING

... for DEDUSTING

... for DEWATERING

The Symons® "V" Screen, the newest addition to the well-known line of Symons screens . . . offers increased efficiency and economy in many phases of coal preparation service.

An entirely new screening principle gives the Symons "V" Screen unequalled high capacity for sharp, single cut, wet or dry separations, especially in the more difficult to screen finer sizes. The screening principle employs controlled diffused feed and vertical flow of material, with a low rotary speed and high speed gyratory action, combining centrifuge and gravitational force.

In dry screening, a natural fanning action carries the "air float" through with the undersize, making the handling of light weight materials extremely effective. In dewatering, the centrifugal action produces a much dryer product.

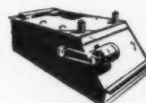
Requiring a minimum of floor space, the Symons "V" Screen is easily installed, and provides fully enclosed construction to assure dustless operation—yet access to the screen is simplified through easily removable covers. *Mail the coupon for further details.*

NORDBERG MFG. CO., Milwaukee, Wisconsin

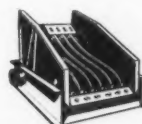
OTHER SYMONS SCREENS



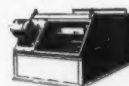
SYMONS
HORIZONTAL SCREENS



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ROD DECK SCREENS



SYMONS
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SYMONS
ROD GRIZZLIES

SYMONS . . . A REGISTERED NORDBERG
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Please send me further information on the following
screens for coal preparation service:

☐ Symons "V" Screens ☐ Symons Rod Deck Screens
☐ Symons Horizontal Screens ☐ Symons Grizzlies

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Company
Address
City Zone State

Drill Operators prefer CP stopers

and
**TUNGSTEN-
CARBIDE
BITS**



Drill operators everywhere prefer Chicago Pneumatic's CP-34 Self Rotating Stoper because it has just-the-right combination of piston speed, foot-pound blow and rotating power to obtain maximum footage from long-life Tungsten-Carbide bits. The rugged CP-34 has all the plus features of heavier models, yet affords real ease of handling. Good balance, fast drilling speed, low air consumption and ability to stay on the job, make it a "must" for every mine.

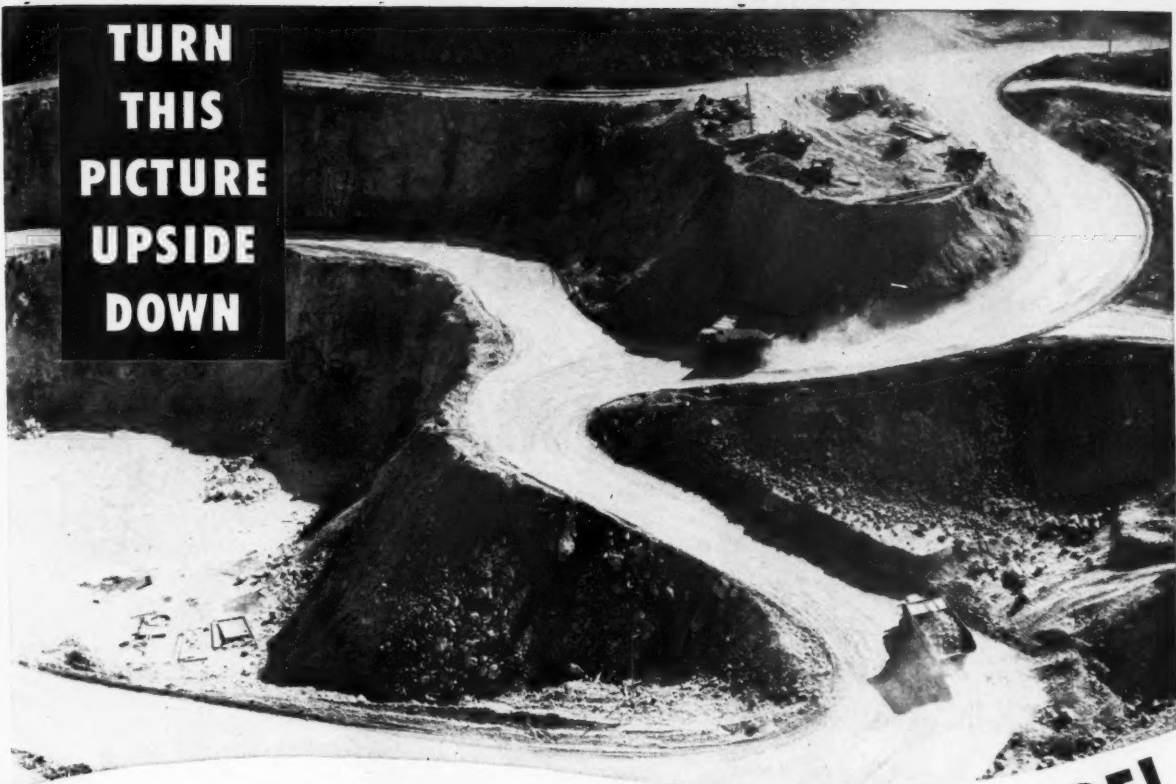
For more information write,
*Chicago Pneumatic Tool Company,
8 East 44th Street,
New York 17, New York.*



Chicago Pneumatic

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

**TURN
THIS
PICTURE
UPSIDE
DOWN**



Any way you look at it... IT'S A TOUGH GRADE!

**yet BIG BUDA diesels
are cutting haulage
costs every day!**

8-DA5-1125 350 HP at 2100 RPM



14 Buda-powered haulage units are roaring up this tough grade . . . 2/10 of a mile with 5 switchback turns . . . hauling payloads up to 22 tons in faster time at a considerable reduction of their former cost.

The extra horsepower and 13 to 25% more displacement . . . greater lugging ability with 9 to 23% more torque of BIG Buda Diesels is paying off at this Bagdad Copper Corp. pit in higher production and lower costs. In many instances, the Budas are going more than 6000 hrs. before overhaul—another factor in lowered costs.



Buda powered Dart dumping at the crusher.

BC-18

Whatever your power requirements, there's a money-making Buda dyna-swirl Diesel to fit your needs. See your nearby Buda Distributor today. Write for Bulletins and data. The Buda Company, Harvey, Ill.

BUDA

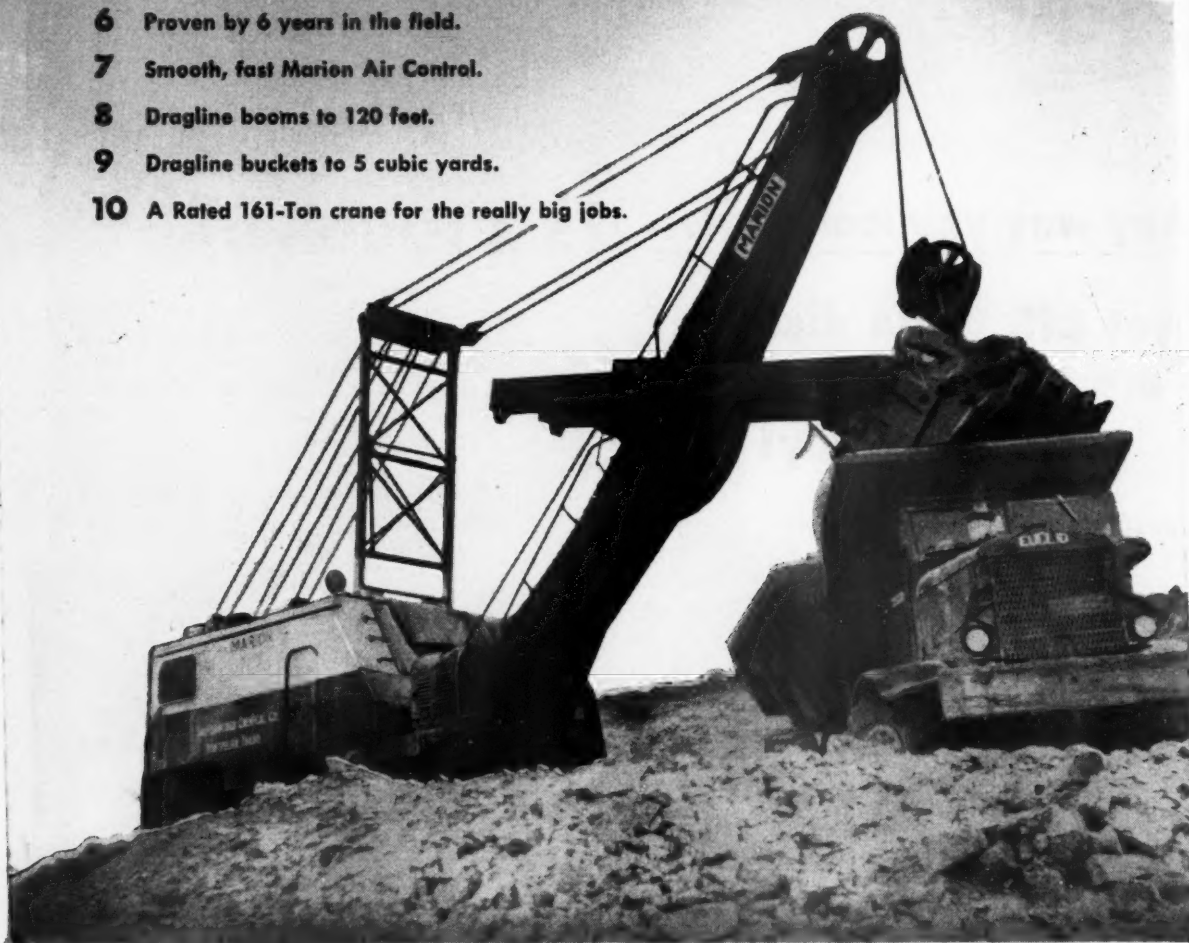
Manufacturers of Diesel and Gasoline Engines, Maintenance of Way Products, Lifting Jacks, Earth Drills and Material Handling Equipment

BASIC FEATURES

That Really Count!

Get them in the
MARION 111-M

- 1 Four cubic yard dipper capacity.
- 2 Electric swing on a diesel machine.
- 3 All-electric if desired.
- 4 Ships on two rail cars.
- 5 Ideal companion equipment of big haulage units.
- 6 Proven by 6 years in the field.
- 7 Smooth, fast Marion Air Control.
- 8 Dragline booms to 120 feet.
- 9 Dragline buckets to 5 cubic yards.
- 10 A Rated 161-Ton crane for the really big jobs.



MARION POWER SHOVEL CO.
MARION, OHIO, U. S. A.

OFFICES AND WAREHOUSES IN ALL PRINCIPAL CITIES



from $\frac{3}{4}$ cu. yd.
to 45 cu. yds.

dynamic new engine gives the popular D Motor Grader increased work power

The thousands who own Allis-Chalmers Model D's know the ability of these versatile machines to do outstanding work on both construction and maintenance jobs. Now — with extra power and added features — the Model D sets even higher performance standards in the low-cost grader field.

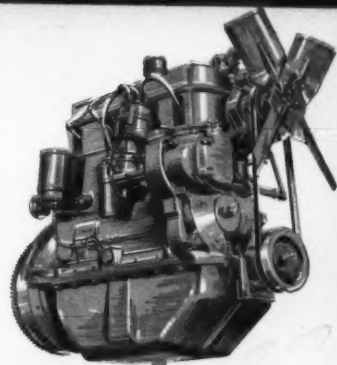
Dynamic New Power-Crater Engine gives the Model D reserve power to : (1) handle the same loads in higher gear or bigger loads in the same gear, (2) increase road speeds, especially where there are grades, (3) reduce need for shifting, thus lengthen clutch life, (4) give better all-round maneuverability. There's plenty of power to crowd while loading with the rear-end loader. Engine throttles down to half speed *and still does the same job* — on low-speed work.

Leaning front wheels* enable the Model D to handle new jobs . . . counteract side-draft on ditching and bank cutting.

Power circle turn* permits easy positioning of blade from operator's seat. When finishing subgrade or blacktop, for example, moldboard can be readily rotated without disturbing road surface.

These and other big-grader features — such as ground-gripping Tandem Drive, ROLL-AWAY Moldboard, Tubular Frame and Power Controls — combined with extra power make the Model D the accepted leader in the low-cost grader field. Ask your Allis-Chalmers dealer to demonstrate on your own job.

ROLL-AWAY is an Allis-Chalmers trademark.
*Optional equipment



**POWER-CRATER Engine
brings truly modern power
to the Model D**

This new engine boosts power while using less fuel per horsepower. It obtains high-octane performance when using regular gasoline. Only by watching a new Model D work can you fully realize what this truly modern engine adds to its performance!

Weight: 8,800 lb. (bare) • Brake Horsepower: 50
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*with integral air-leg feed and
automatic air-water back-head*

Perfected
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No. 380 AUTOMATIC DRILLING MACHINE

*With Aluminum Cylinder
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TOTAL WEIGHT 80 LBS.
36" OR 48"
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INTEGRAL AIR FEED eliminates improvised clamping, extra air hose; consolidates drilling and feed controls on back-head of machine. Easier to set up, easier to adjust, easier to run.

AUTOMATIC AIR-WATER BACK-HEAD controls water and air from single throttle. Optional plugs for dry collaring, or dry drilling. Provides complete versatility for all drilling conditions.

Check these *Thor* features!

- 1 CONTROLS conveniently grouped on back-head for safe, convenient operation.
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- 11 EXCLUSIVE NEW HOLDING HANDLE provides greater safety. Conventional spade handle optional.
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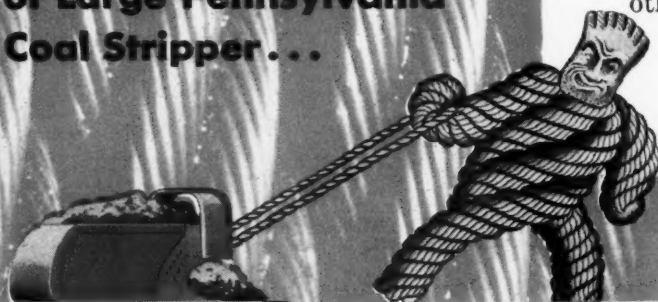
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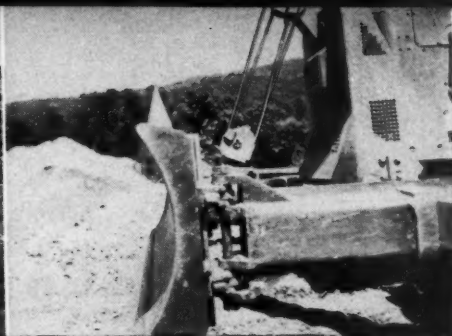
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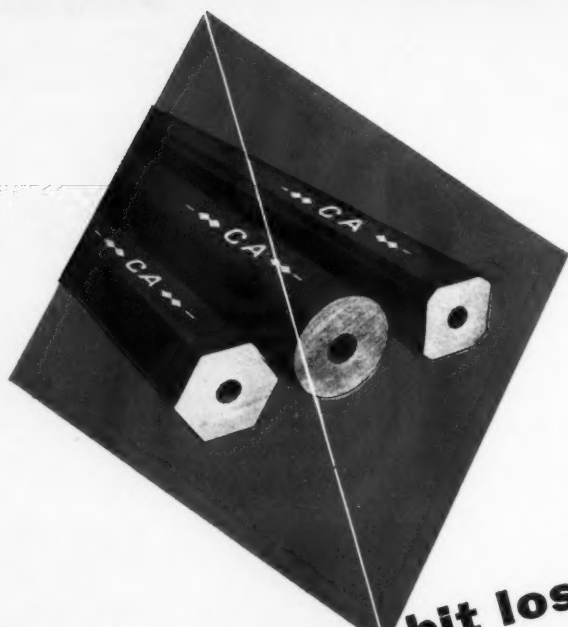
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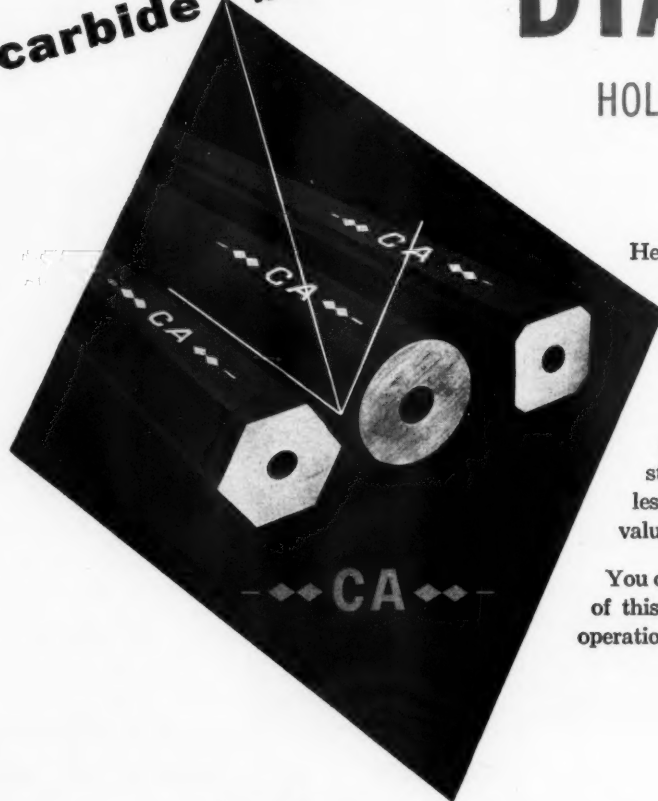
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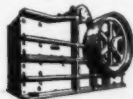
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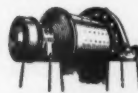
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Jaw Crushers



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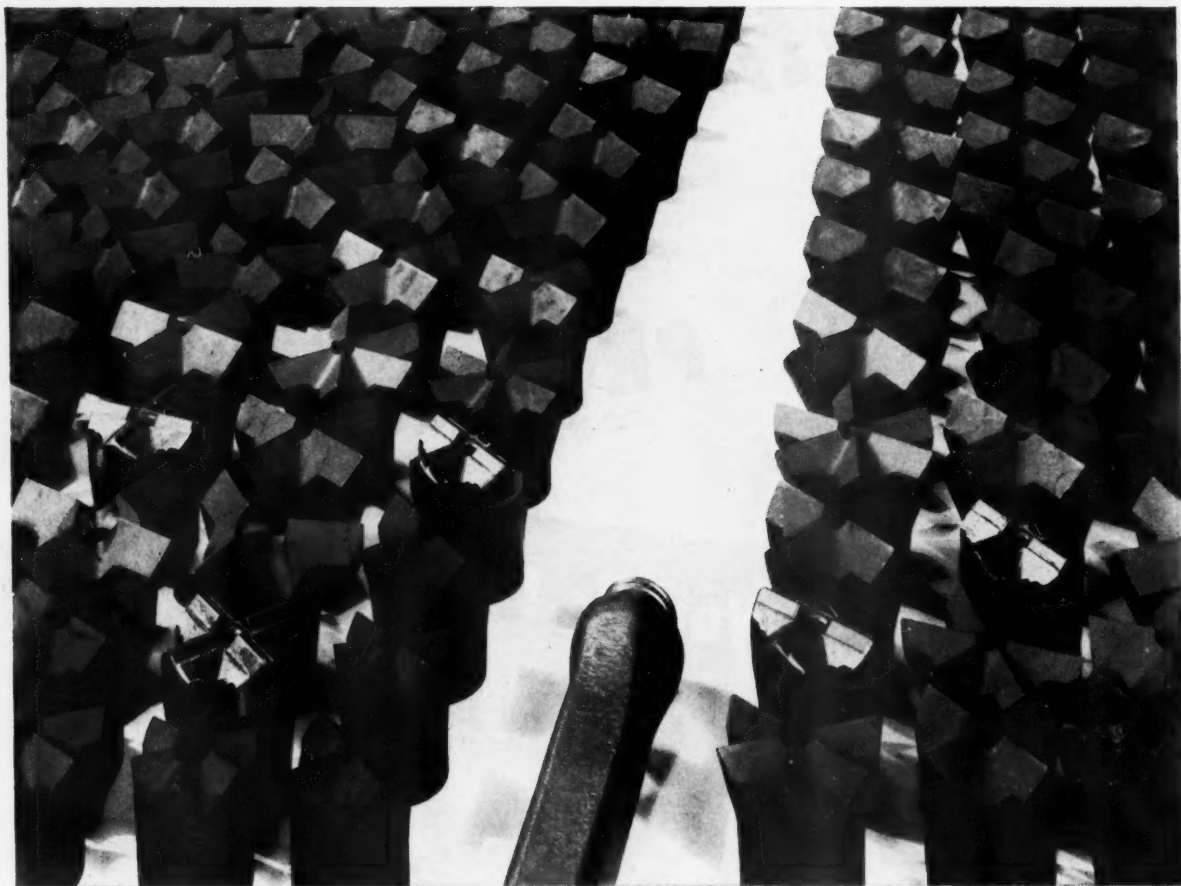


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You can change bits in a minute...save drilling time!

THERE'S no need to stock expensive double inventories of drill steel when you use both Timken® multi-use and carbide insert bits. In the same thread series, both types fit the same drill steel. In one thread series, for instance, there are dozens of different Timken bits.

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Both Timken multi-use and carbide insert bits are made from electric furnace Timken fine alloy steel, have special shoulder unions that keep drilling impact from damaging threads.

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Most economical for ordinary ground. With correct and controlled reconditioning, they give lowest cost per foot of hole when full increments of steel can be drilled.



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Give highest speed through hard, abrasive ground. Also most economical for constant-gage holes, small-diameter holes, very deep holes.

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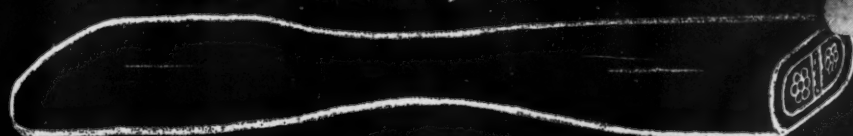
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HOW TO SPOT DAMAGE FROM TOO MUCH TENSION

THIS:



MAY MEAN THIS:



NECKED-DOWN SECTION

... AND WHY ANACONDA'S NEW BALANCED DESIGN ADDS SAFETY, LONGER LIFE TO CABLE

Necked-down cable shows overstretching. Jacket and insulation become thin, easily punctured. Moisture penetration or a broken ground conductor may make the cable hazardous.

ANACONDA'S ANSWER: BALANCED DESIGN

Tension devices help; but aren't cures-all. An added safeguard lies in the balanced design of Anaconda's new mining-machine cable. Stretchability of the ground has been increased. It will not break before the power conductors. A new neoprene jacket has higher com-

pression-cutting resistance and tensile strength. In the insulation more strength and moisture resistance are obtained from a cold-rubber base . . . similar to that used by tire makers to mold a tougher tire. Stranding, too, has been re-designed to make the whole cable more flexible . . . at no greater cost. You get less trouble from tearing, cutting, gouging and abrasion caused by rib-pinch, runovers and dragging.

MUCH LONGER AVERAGE LIFE

In shuttle cars recently surveyed in 15 mines, ANACONDA Cables last 3 times

as long as cables made only a few years ago. To learn why this is so, ask your nearest Anaconda Sales Office or Distributor for a sample section of this new cable. Examine it . . . take it apart. And remember that no ANACONDA Mine Cable has ever failed a U. S. Bureau of Mines flame test. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

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TODAY'S HEADQUARTERS FOR MINE CABLE

FLAT TWIN CABLES FOR
shuttle cars
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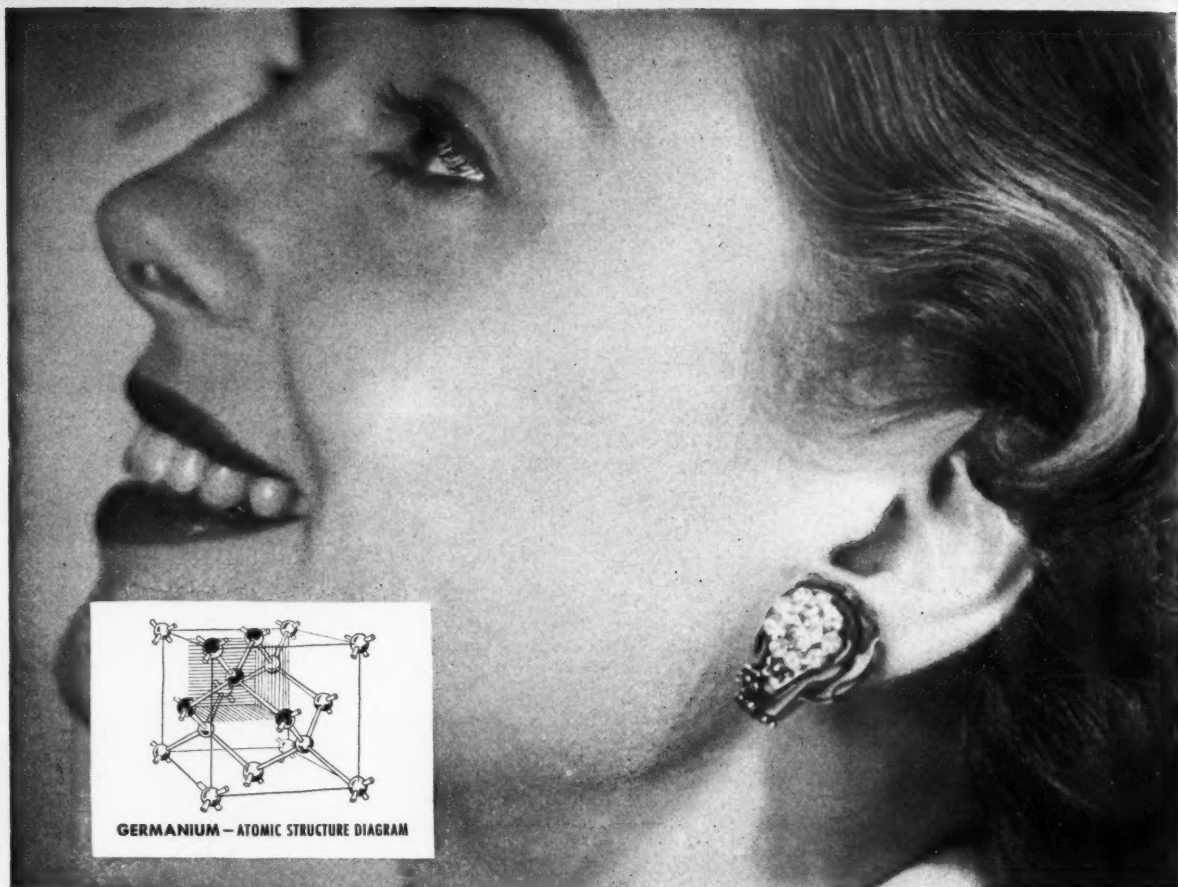
TELEPHONE WIRE



SHOT FIRE CORD



WELDING CABLES



Atomic Structure diagram courtesy Bell System Technical Journal

When it is hard to spot the hard-of-hearing...

Eagle-Picher Germanium has helped to make the modern hearing aid more efficient, and surprisingly lighter in weight. Old-fashioned hearing devices, with large cumbersome batteries which told the world of the wearer's affliction, have been outmoded.

Much of this is true because Germanium has inherent electronic properties that make possible the replacement of certain vacuum tubes with much smaller Germanium transistors. Transistors use so little power that batteries used to operate them are not only smaller and simpler, but will

last for months instead of days.

Thus, hearing aids become pocket-size while gaining efficiency . . . and the hard-of-hearing blend into the crowd without missing a sound.

Devices such as transistors and diodes, made with Eagle-Picher Germanium, are used by America's leading manufacturers of electronic equipment in hearing aids, television sets, computers and a host of other items. This rare metal, Germanium, or some of the other Eagle-Picher products listed below, may serve in your business too. Let's talk it over.



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A good name on any product. Widely known as an important factor in mining, smelting and processing of lead and zinc, Eagle-Picher provides many products for essential uses in the steel, paint, glass, ceramic, chemical, storage battery, automotive and farm equipment industries.

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✻ Editorials ✻

JOHN C. FOX, *Editor*

NOVEMBER, 1953

Thank You, Mr. President

AT the recent American Mining Congress Convention in Seattle, reported in full in this issue, the need for a realistic National Minerals Policy was again emphasized by outstanding figures in both industry and Government.

President Eisenhower, himself, recognizes this need. In a letter dated October 26 to Interior Secretary McKay, the President has this to say:

"One of the essential problems before our country is the establishment of a national policy relating to the production and utilization of minerals and metals. The prudent use and development of domestic mineral resources, as well as assured access to necessary sources abroad, are indispensable to the operation of an active economy and a sound defense.

"We must make sure, as Americans, that we have available mineral raw materials adequate to meet any contingency during the uncertain years ahead. Chronic shortages of many minerals and metals have plagued us during every emergency, and the strength to meet any new crisis in large measure will depend on our ability to obtain these materials in sufficient amounts. The problem is compounded, of course, by the ever growing requirements of an expanding economy."

Recognizing the contributions of the mining industry toward preparedness and recognizing the depressed state of some parts of the mining industry, the President has appointed a committee to prepare recommendations for consideration by himself and the Cabinet toward resolution of the serious problems facing the mining industry—in short a committee charged with formulating the beginnings of a realistic national minerals policy. Chairman of the committee is Interior Secretary McKay; others designated by the President are the Secretaries of State and Commerce and the Director of the Office of Defense Mobilization. He suggests that this committee work closely with the Bureau of the Budget, the Department of the Treasury and "such other departments and agencies of the Executive Branch, as well as individuals and organizations, as are concerned with these matters."

Further indication of how urgent is the need for such an investigation and the crystallization of a firm national minerals policy was brought out in the open hearings held by the Minerals, Materials and Fuels Subcommittee of the Senate Interior Committee. Otto Herres, chairman of the National Lead and Zinc Committee and first industry witness, pointed out that the "mineral policies of the State Department over the past 20 years have been responsible for metal shortages during two wars of this period and for price instability that has been harmful to producer and consumer alike."

It was also brought out at these hearings that whatever minerals policy this country has had plays right into the hands of the Kremlin. That policy seems to have been to leave our own minerals in the ground and to purchase from the farthest foreign sources. Sources which in the event of war would certainly be cut off from us. Often the excuse for such a policy has been that we do not have deposits of many of the strategic minerals and are short in others.

This contention was refuted by two Bureau of Mines officials who testified that the Western Hemisphere could, in an emergency, be virtually self-sufficient in everything but industrial diamonds.

It is high time the importance of our mining industry be recognized and our Government take positive action to foster this vital segment of our economy. We thank you, Mr. President, for the steps you have taken in the right direction.



Rubber tired trucks haul ore from muck pile underground to ore bin

Trackless Mining at Pend Oreille

METALINE Mining District is located in the Northeast corner of the State of Washington. The area is approximately 30 miles long and two miles wide reaching from Ione, Wash., nearly to Salmo, B. C. The mines that are developed ready for production, in production and closed down due to low metal prices are:

The Metaline Mining and Leasing, Grandview, Pend Oreille in Washington and the Reeves MacDonald, Canadian Exploration, and HB Mines located in British Columbia, Canada. The only mines that are in production during this period of low metal market price are the Grandview, Canadian Exploration and Pend Oreille. All these mines are using some type of trackless mining equipment either for part or nearly all of their total production.

We are dealing here with the Pend Oreille Mines and Metals Co. operation.

Geology and Mining Outlined

The orebody is a low grade zinc and lead replacement deposit in a dolomitized and silicified zone in Cambrian limestone below shale. The orebody is intensely folded, faulted and shattered so that the mine plunges gently to the northeast.

Pend Oreille mine had been producing approximately 800 tpd for a selective flotation mill from slusher

Trackless Mining Spells Difference Between Profit and Loss at Low Metal Prices

By L. M. KINNEY

General Superintendent
Pend Oreille Mines & Metals Co.

mining methods until September, 1952, and since has been producing 1600 tpd from a combination of slusher and trackless mining methods. The mine for slusher and track mining has been developed by contour drifting near the footwall of the orebody. The drift levels being the 2200, 2000, 1900 and 1700-ft levels. Raises were driven from the levels to the top of orebody where side-swiping proceeded and, after limits of slushing has been reached, any ore that goes higher is removed by shrinkage stoping. After the backs are trimmed, benching proceeds from the raise in eight to 12-ft high benches and new benches continue until the footwall is reached. The development for this type of mining required a large amount of drifting and raising. Due to the irregularities in the orebody it is difficult to keep the drifts in commercial ore. If by using trackless haulage, we could follow the irregularities in the ore and eliminate some drifting in

waste rock, a saving in mining costs would result.

Purchase Diesel Units

Various types of diesel equipment and trackless mining methods were investigated and it was decided to purchase a trial unit. This unit was put into operation July 1, 1952 in an area that would require a sublevel drift or be mined by under hand slushing methods. In other words, the muck would have to be pulled up hill with a slusher. The heading was started in ore on minus slope of 15 percent with a Jumbo, the muck loaded into a truck with a loader and then hauled up grade to the grizzly. This method proved very economical and it was then decided to purchase additional equipment to proceed with trackless mining in other and more favorable locations.

The method of mining with trackless mining methods will be to take a horizontal slice 14 to 16 ft high and

the width of the orebody. After the slash is completed, then any ore remaining in the back will be taken down by drill holes pushed into the back with the Jumbo. If one 10-ft high face does not remove all of the ore, the jumbo will then drill from top of muck pile. This procedure will be repeated until top of ore is reached. After the ore is blasted, the loaders and trucks will remove muck pile before benching commences. Then benches will be taken 20 ft high and the width of the block, and will be repeated until footwall is reached. If the block of ore being mined goes up or down, the first horizontal side swipe will follow this slope on a grade favorable for truck haulage. This type of mining has eliminated manways and ore chutes, waste raises and drifts that are required with track and slusher mining methods.

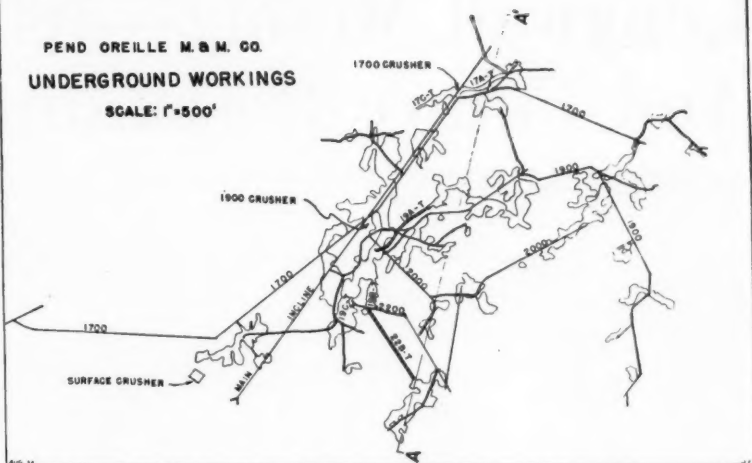
Types of Equipment Used

Jumbos used for drilling are the Rogers Iron Works crawler type, each track being powered with air motors, one Allis-Chalmers HD 5 diesel tractor and one D 4 Caterpillar diesel tractor with frames for supporting drill machines and jibs. Each jumbo has two Joy extendable Hydro-drill jibs with nine-ft boom and three-ft mechanical extendable feature. Swing and raise are powered by an automatic air driven hydraulic pump. Each jib has a Gardner-Denver model D-93-P automatic drifting drill mounted on a model C or B chain feed with moveable cone for 10-ft steel change and powered by a Gardner-Denver Model C-M-51Y feed motor. The shell has a one-foot extension added to front end to keep hole spotter on steel at all times while drilling. The steel is 1½-in. round, high carbon steel made up in 12 to 13-ft lengths using 1½-in. detachable insert tungsten carbide bits.

Quadruple Drill Footage

The average round consists of 40 ten-ft holes either in a drift, side swipe or bench. The drift rounds average 150 tons per shift, side swipe rounds average 300 tons per shift and bench rounds average 600 tons per shift. The holes are loaded with 1¼ by 12-in. Dupont Gelex No. 2 or Atlas Gelodyn No. 3 powder. Electric blasting either with regular or Millisecond delays, and fuse, and caps are used. The type of caps used depends on location and type of round to be broken. A two-man crew in a stope using a bar or tripod would average approximately 100 ft of drilling per shift and now with the Jumbo and two machines the same two-man crew will average approximately 400 ft of drilling per shift, which has increased the number of tons broken approximately 400 percent per miner.

PEND OREILLE M. & M. CO.
UNDERGROUND WORKINGS
SCALE: 1"=500'



Workings at Pend Oreille were laid out for contour mining

Build Up Tractor Pads

One Eimco 104 rocker type loader and five Allis-Chalmers HD-5-G front end loaders are being used for loading broken ore into trucks. The Eimco loader is very adaptable for mucking drift rounds, side swipe or bench rounds, but it has the disadvantage of not cleaning up faces properly and building roads. The front end loader will do all very successfully, but removing drift muck. In drifting, the front end loader requires turnouts spaced at frequent intervals.

Various types of pads and welding and building up of manufacturer's pads have been tried with fair performance. The most recent and apparently practical, is an alloy pad cast two in. thick and 11 in. wide instead of the manufacturer's 13-in. wide, thin pad. This pad has been wearing well and has eliminated excessive welding of the thinner pads. It is anticipated that the thicker pad will last the life of the rail. The pads, rail

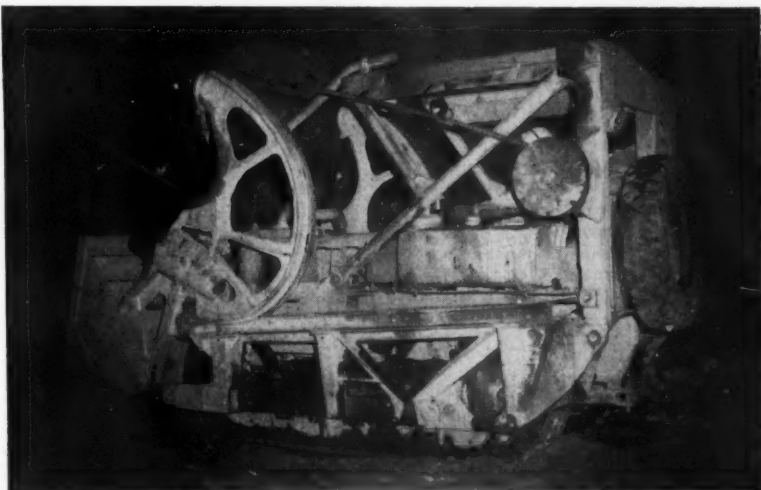
rollers and drive sprockets are the main points of wear. It also has been our experience that loading equipment is down approximately 40 percent of the time for repairs.

Seven Dart Model 100 special underground truck chassis with a 6.3-cu yd capacity bed built by Landis Steel Co. and powered by a 110 Cummins Diesel Engine are used for hauling broken ore from headings to grizzly.

Equipment Distribution

Two Jumbos—two loaders and three trucks are used on the 2200-ft surface adit level. The ore here is hauled from mine face to surface orebin ahead of primary jaw crusher. The 2200-ft level has been mainly benching as the top of the ore was removed by slushing and track haulage. Average performance on this level has been approximately 115 tons per miner shift, 255 per loader operator shift and 130 tons per truck driver shift.

(Continued on page 105)



Rocker shovels performed well for all loading jobs except in drifts

Longwall Mining—Its History And Future Possibilities*



The Fast Planer mines slices from two to five in. thick

An Old System With a New Look Appears to be the Method for Mining Thin Seams Economically

LONGWALL mining is not a new "art and science" in the history of the coal mining in the United States. Longwalls have been in operation for many years in several States from Pennsylvania down to Alabama, with peak production perhaps between 1922 and 1932. One operator in Central Pennsylvania mined more than 2,500,000 tons on seven longwalls. The reasons for its adoption were: Greater production per longwall face with corresponding lower capital expenditure; savings in service labor; better recovery; closer supervision, and other inherent advantages.

But in spite of all the efforts and the remarkable ingenuity of some operators, only a few longwalls were a success. The majority were doomed to failure for three main reasons:

- (1) Lack of proper roof control.
- (2) Lack of adequate face haulage
- (3) Lack of longwall power loading

* Based on a paper presented at the Kentucky Mining Institute, November 13, 1952.

Many faces were lost in spite of costly handpacked ribs, cribs and heavy steel props. The best steel prop of those years, the Lorraine Prop, weighed 422 lb with a maximum length of five ft. No research had been done regarding roof pressure and strata movements. Coal was handloaded into cars or conveyors along the longface and the conveyor had to be broken up and reassembled after each cut.

The logical consequence of these unhappy experiences was, for the following two decades of rising costs, the exclusive concentration on mechanizing orthodox room and pillar mining.

Longwall Mining in Europe

In Britain and Europe the original room and pillar system had long been abandoned in favor of the more suitable longwall mining because of the great depth of the coal seams, the difficult geological conditions, the

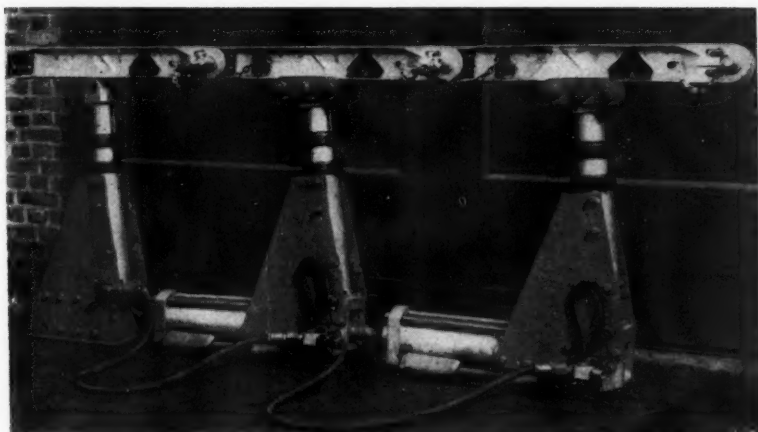
By J. A. SCHLICKAU

Mining Engineer
Pikeville, Ky.

need for full recovery of the limited coal reserves and the inherent advantages of longwall mining.

The present trend of modern longwall mining is to retreat or advance a face a maximum distance in a series of small steps to insure highest production per shift and output per man-shift. This new trend with 100 percent continuous mining and with the highest production per shift ever obtained at a single face originated in the Ruhr during the war.

New and unconventional ideas and devices regarding roof control, face haulage, power loading were the outcome of many years scientific research and experimenting to achieve full continuity of longwall operation with



First experimental mechanized roof support unit tried in Great Britain

maximum output per manshift and production per shift. The new coal getting device, the so-called planer or plow, was a remote controlled simple tool ripping off small slices of coal and plowing it over to the face conveyor.

The all important question of roof control had already experienced special treatment in the Ruhr since 1930 which produced a whole line of collapsible rigid and yielding props of steel or light alloy now in operation at practically all longwalls of the world. For the planer, a new system, the so-called free front or propfree timbering system had to be developed. "Propfree" because there are no posts between the longwall face and the face conveyor. The retreating longwall is not immediately followed by a new row of posts, forepoles or bars over the posts are lengthened to support the newly exposed roof close to the face. They bridge over the face conveyor which is automatically pushed over and kept against the longwall face.

The new flexible longwall face conveyor, during the last few years, has found wide application also on cutting longwalls. It serves the double purpose of conveying coal and furnishing track and guide for the cutting machines and cutter loader.

The last and perhaps most important contribution to the modernization and mechanization of longwall mining is the fast planer which, in connection with the flexible face conveyor, is the first legitimate continuous mining machine and has plowed its way within the last two or three years through all known coal mining fields of the world.

Roof Control

The prerequisite of a successful longwall is proper roof control. This comes first in all considerations. The longwall supports carry the load of the main and immediate roof up to the caving line at the gobside. It is of

prime importance to keep this roof cantilever over the longwall face intact, to preserve its own carrying strength, to use its weight upon the coal opening cleats and finally, to throw off the load at the breaking line regularly when it served its purpose. Longwall roof support consists of props and bars or cribs, sometimes a combination of these supports.

Cribs are still used in thin seams with soft bottom; in high seams with sidethrust, and as reinforcements.

Modern cribs consist of a steelbase with shock releases and hard wood blocks on top of them wedged up tightly against the roof. Compared with the old type they are rigid, of very high load capacity and easy to withdraw and reset.

With normal bottom and top, collapsible props are preferred because of their easier adjustment to variations in seam thickness, favorable load characteristics and high handling ef-

iciency. The modern jack is made of steel or light alloy, of either the friction or hydraulic type, collapsible to facilitate safe withdrawing and re-setting at a setting load up to eight or ten tons. After a slight convergence of a fraction of an inch the prop takes over the load of from 20 to 80 tons according to length and design or purpose. The friction-type posts usually carry a much higher load than the still delicate hydraulic type. To prevent deformation the prop yields slowly keeping up the normal load. For the support of the immediate roof over the face conveyor usually three-ft long forepoles are employed. These follow closely in small steps and in staggered formation the continuously retreating longwall face always covering the newly exposed roof.

So far, artificial roof support along the longwalls must still be handled in spite of untiring efforts and much time and money spent on mechanization of the process. The first fully mechanized, effective roof support was in operation, during the war, at the Petroseni mine high up in the Carpathian mountains of Roumania, where a thick vertical coal seam was mined in nine-ft horizontal slices. This mechanical roof support was later shipped to Russia together with the plants that manufactured the supports.

Face Conveyor

The second important development is the continuous haulage over flexible, sturdy, double-chain Panzer conveyors, the longwall version of the well-known double chain scraper conveyor. Unlike most other face conveyors, the Panzer is intended to be moved forward bodily and does not require



Coal rolls off the conveyor of a Fast Planer

dismantling with each advance. With a flexibility of 4° in the pan connections vertically and horizontally, it may be jacked forward immediately after the plow or loader has passed. The construction is such that no damage is caused if a coal cutter is mounted on the framework or if heavy falls of rock or coal occur.

A double chain is the carrying medium. Each chain is composed of three-ft lengths joined together by couplings. The couplings are made of softer metal than the sidewalls of the conveyor and are shaped to present a gliding surface at the top and side, effectively guiding the chain over changes in altitude and direction. At each chain coupling a transverse scraper bar connects the two chains. Owing to the higher friction and the heavy weight of chain and scrapers

conveyor is 150 fpm with a capacity of one to five tpm, or 500 to 1500 tons per shift.

Develop A New Machine

The third important contribution to longwall modernization and mechanization is the plow and in its latest edition the fast plow or fast planer as a single unit with the aforementioned Panzer conveyor, thus presenting the first legitimate continuous coal getting, loading and conveying machine.

The fast planer is simple in its construction but many-sided in its performance, a radical departure from the cutting and drilling type of coal mining as it strips or planes thin layers from the solid coal face. The planer is short and is adjustable in height from two to seven ft, with two symmetrical halves and 10 to 12

length and seam characteristics and under normal conditions, amounts to 0.1 hp per foot of length and 100 tph production.

Accordingly, a conveyor 600 ft long and handling 150 tph needs 90 hp. As the motors also provide pulling force for the planer, the total horsepower necessary for a 600-ft longwall face and a production of around 1000 tons per shift amounts to 120 hp.

The fight of the American coal operator against rising costs, especially in the low coal field, the need of better recovery of valuable metallurgical coal and the success of mechanized longwall mining abroad opened a new phase domestic coal mining recently, with a series of trial runs with the Samson Stripper, the Mecco Moore and the Fast Planer.

Hydraulic Plow Sound Idea

The Samson Stripper, the hydraulic or walking plow is a distinct improvement over the original German plow pulled along the face by separate winches. The strong hydraulic pressure behind the cutting knives or wedges should enable the machine to enter the hardest coal. But so far, it has been necessary here, as well as in Britain, to pre-cut the face to increase production. Due to the width of the planer and coal slices, the flexible face conveyor cannot be pushed over behind the machine close enough to the coal face to prevent coal from falling between face and conveyor. This necessitates handloading or, as has been proposed in Britain, a trailing plow.

Roof Support Difficult

The Mecco Moore is quite a success in Britain with over 70 units in operation predominantly in the favorable conditions of the East Midlands. In spite of these advantageous natural conditions, a more economical roof support is needed for the machine with its rather large dimensions. The new and more efficient front free timbering system, was tried to eliminate costly temporary timbering behind the machine and reduce delays at the face ends. But, as the three ft wide cutter-loader takes a 5½-ft cut, the forepoling bars had to support a span of nearly nine ft of newly exposed roof between the cutting depth and the first row of posts behind the face conveyor. Such a distance is prohibitive for the limited carrying capacity of the bars.

The same problem applies to the third longwall machine, the Dosco-Miner. In its improved design it still has an over-all length of 16 ft 6 in., a cutting head of 48½ in. wide and a height of 43 in. with a weight of 20 tons. These dimensions are standard in room and pillar mining but prohibitive under the limited roof cantilever of a caving longwall, especially in lower coal. The present roof



The Samson Stripper has seen successful service in at least one U. S. coal mine

the drivers of the conveyor must have a greater power than those required for normal duty. Provision is therefore made for a maximum of four driving units for each conveyor; two at the discharge and two at the tail end for a certain conveyor length and grade. The normal length of longwall in Europe is around 600 to 700 ft with occasional lengths in favor of the load up to 1500 ft. The drive unit for a short 300-ft face conveyor consists usually of two 40-kw, ac electric motors, one at the discharge and one at the tail end. The motors are connected to the chain sprocket through a hydraulic coupling. Electric control of both motors is interlocked and the cable operating the remote control for the tail end drive is carried from the main gate in channel iron ducts bolted to the gobside of the conveyor framework. These ducts also contain the signalling conductors.

A Panzer conveyor usually discharges onto an intermediate feeder conveyor. Pneumatic shifters are used along the longwall at 20-ft centers to force and hold the Panzer against the face with the drive and tail end moved over by a sprocket chain coupled to the drives. Normal speed of

strong cutting bits on either side. Driven by the conveyor drives over a separate chain, with a pulling strength of 50 tons and a speed of 75 fpm, the planer takes slices from two to five in. thick, even in medium hard coal. It plows the coal, which is often opened in its cleavage by the roof pressure along the longwall, over to the chain conveyor with a capacity of 1.5 to 3 tpm. The height of the planer is normally ½ to ¾ of the seam thickness. Top coal is expected to break down by its own weight and drop into the conveyor after being undercut. The strong tungsten carbide cutting bits have a long life and in friable coal, often over 300,000 ft of planer travel. Its short length makes the planer especially adaptable to undulating seams.

Makes Little Dust

A remarkable feature of the fast planer is the dustless operation; and in spite of the thin slices, 30 percent of the output is in lumps of over five in. The explanation lies in the combination of roof pressure and tearing action of the planer as it rips the coal from the solid. Power consumption of the planer set-up varies with face

support of the submarine Canadian Longwall Faces is so expensive that they are of no practical interest in the United States at the moment.

The fourth and last longwall machine is the Fast Planer. According to a Bureau of Mines Report published* about the first planer trial run at Helen, W. Va., the average production per shift was 582 tons and 18 tons per man shift. Average production during 15 consecutive days was 731 tons and 19.4 tons per man shift; maximum production per shift, 842 tons with untrained, oversize crew, undersize face length and delays from main haulage and power.

The production per shift and man-shift at the second planer face increased further. With a normal longwall length of 500 to 600 ft, twice as long as before, with better roof control and trained crew, the production per manshift could and should easily reach around 30 tons in the 34-in. Pocahontas No. 4 Seam.

Summarizing the results of the three longwall experiments to date, it seems somewhat early to draw final conclusions as it takes time to introduce a new mining system and to break in men and machinery.

Future In U. S.

The Fast Planer is at its best in soft and medium hard coal. In sharp contrast to Europe the United States offers, with great reserves of undisturbed, flat and shallow seams, the best opportunities for efficient modern longwall mining. But back of this bright American coal picture are three dark and sore spots—handicaps Europe does not have: ever increasing labor costs, a short workweek and a highly competitive market. In addition, quite a number of American coal

seams show such unfavorable conditions also less known in Europe as: undulations with sharp grades, soft bottom and strong sandstone roof, difficult or impossible to break, and a very changing character of the coal and accompanying strata with varying thickness. Fortunately the favorable features predominate.

Points To Watch

As only the caving system can be employed, props and cribs should be as rigid as possible and of such high load capacity, that they not only support the roof cantilever over the working face with occasional overhangs but also form a rigid pivot point for a straight caving line.

All props should have the same load characteristic to secure early and high resistance evenly distributed over the face. The props should be designed so they can be withdrawn safely at the breaking line and reset at the conveyor with a setting load of ten tons or better immediately, with the full load of 30 to 45 tons in low seams.

As protection against overload the props should yield slowly but maintain their full resistance.

Bars upon the props for the support of the immediate roof should be of sufficient strength and be forepoled safely from the gobside and not over the running conveyor or planer.

Cribs should be of the modern rigid type only with steelbase, shock releases and hardwood blocks tightly wedged against the roof. All supports should be of the "fast moving" type and follow the face in a manner to secure the shortest possible roof cantilever, avoid breaks over the face and weight over the supports. Until roof control can be mechanized, all efforts should be made to reduce the timber crew to perhaps 50 percent of the longwall crew. To achieve this end, the props should be of the light steel

or light alloy type, without a separate setting device or clamping lock of the wedge type, which requires too much labor—time and depends upon the attitude of the miner for their effectiveness. The props should be quickly withdrawn and reset by one man. They should have sufficient extensibility to suit sharp variations of seam thickness and should collapse for quick withdrawal. The props should combine light weight, high load capacity and strong construction to reduce repairs to a minimum, with general overhauling during moving to another panel.

The face conveyor should be flexible enough to follow sharp undulations on 600-ft faces, and powerful enough to handle peak loads on long retreats. The discharge head should be of such height as to prevent undue rock handling at the belt head. Dismantling and reassembling of a complete installation should be specially organized and done in two days.

Mining and powerloading should be continuous without delays at face ends and with a retreat of 15 to 20 ft per shift on 500 to 600-ft faces, depending on face length and character of coal, to secure maximum production per manshift and face.

The cutterloader, Mecco Moore, and the hydraulic planer, Samson Stripper, are suited primarily for hard coal seams. Many attempts have been made to mine hard coal by activated plows with the most successful one the "Westfalia Fast Hower." At present further experiments are being carried on by the Bureau of Mines with an activated German Planer in the Anthracite Region.

Mining Plans

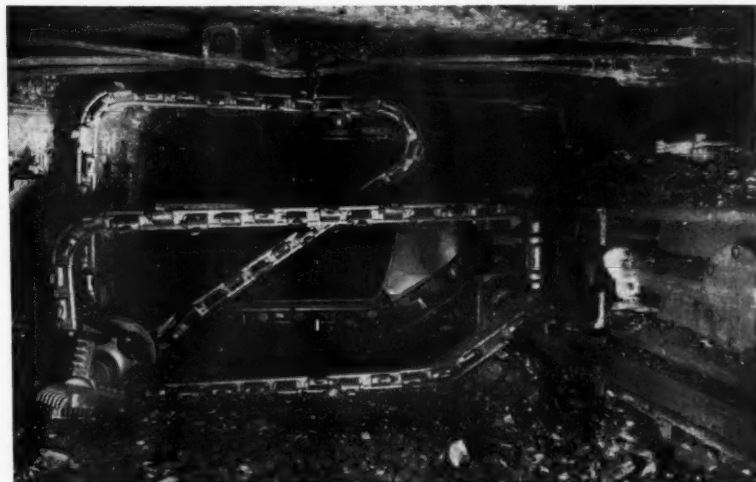
It is quite fortunate that modern longwall adapts itself easily to the conventional room and pillar mining panel. To take full advantage of longwall mining the butt entries should have a maximum length of 3000 to 4000 ft with 500 to 600-ft faces retreating on both sides and discharging onto the same entry-belt in the center heading in order to secure maximum production per move and per belthead.

The future American longwall mine may well consist of development sections for main and butt entries and one double shifted longwall of about 600 ft on butt entries 3000 to 4000 ft long, with the belt in the center heading and a daily longwall production of 2000 to 3000 tons.

Maximum mine concentration is attained by a longwall double-set with one double-shifted longwall on both sides of the butt entry simultaneously retreating with a single 1200 to 1300-ft face discharging on the same center entry belt with a daily production over its main line loading point of 4000 to

(Continued on page 118)

* Mining with a German Coal Planer, MINING CONGRESS JOURNAL, October 1952, P. 56.



Coal is cut from the face by the Soest Ferrum cutterloader



After the war, modern loading and haulage units were purchased

Changes in Primary Drilling at Northwest Magnesite

Rotary Drill Proves Satisfactory for Blasthole Drilling

By R. L. FISK

Supt. of Mines,
Northwest Magnesite Co.

BEFORE describing recent developments in primary drilling methods at the Northwest Magnesite Co., it will be helpful to review briefly previous drilling and mining practices.

Originally, all primary drilling was done with jack hammers employing 20-ft hand-sharpened steel. Vertical holes were drilled into the floor of 40-ft benches with the bottom and toe relieved by 20-ft lifters. Usually all holes were sprung to allow more powder at the bottom of the holes. The broken rock was then hand-sorted into one-ton Kopple cars and hand-trammed either to the ore raises or waste dumps. All material which passed through a rock fork was discarded with the waste rock as it was profitable to hand-sort material which would pass the 1½-in. openings. Two muckers were assigned to each car and their tools consisted of a pick,

shovel, hammer, and rock fork. Quarry floors at this time were a maze of tracks and the production at a working face was limited by the number of tracks that could be placed on a floor.

The first change in primary drilling practice was the employment of light wagon drills. During this period Dempster Dumpster units replaced the Kopple cars and eliminated all the tracks previously used in the quarries. Twenty and 30-ft benches were found more economical than the previous 40-ft levels. The 24-ft down holes were drilled on square grids which varied in spacing from 4½ to 8 ft. This spacing was dependent upon the breaking characteristics of the rock. Horizontal holes were often drilled in to the toe to break bottoms. No springing was required with this system of drilling. Detachable bits were first used. These were later replaced

by tungsten carbide insert bits. Wagon drills were exclusively employed for primary drilling until 1950.

In 1943 a heavy Media Plant was installed which replaced the hand-sorting system but did not change



Rotary drill provides most satisfactory method of producing blastholes in Washington magnesite

primary drilling methods. Power shovels and trucks previously used for waste stripping and mining high grade ore bodies were then used for all rock handling at the working faces. This change was rather timely since many of the men released could be used to fill vacancies created by the war.

Move Mining Operations

Prior to 1946, all the ore was mined at the Finch Quarry located 400 yd from the heavy Media Plant and the Allen-Moss property one-half mile away. Magnesite ore was transported from these two properties to the mill with electric trains. These trains were later replaced by direct truck haulage to the primary crusher.

In 1946 the Keystone property located five miles from the mill was placed in production. Ore from this property is transported to the mill by a cable tramway.

Rock Harder to Drill

This property was somewhat more difficult to mine than either the Finch or Allen-Moss quarries. Not only was the rock massive and blocky, but large mud-filled fissures were encountered which made wagon drilling almost impossible. Fragmentation was so poor that, even when primary drilling was spaced on a 4½-ft square grid, an average of 1000 secondary boulders were drilled and shot each 24 hr. It was necessary to reduce the rock size to pass a 14-in. grizzly ahead of an 18 by 24-in. jaw crusher.

In 1949 the cable tramway was projected an additional three miles to the Red Marble Quarry. Magnesite ore found on this property is similar to that at the Keystone Quarry but is somewhat harder to drill. In order to reduce the excessive amount of secondary breaking encountered at the Keystone Quarry, a 42-in. gyratory



Rotary drill pattern—each hole is tagged with hole number, depth, driller's name

crusher was installed which would accept any rock passing a 2½-cu yd shovel dipper. Seventeen-ton rock trucks dump directly into this crusher. As expected, a substantial reduction in secondary breaking resulted from the large feed opening provided by this 42-in. crusher. It was found necessary, when using the 18 by 24-in. crusher at the Keystone Quarry to drill 209,000 boulders in order to produce 234,000 tons of rock. This made a ratio of one drilled boulder for each 1.1 tons of mined rock. At the Red Marble Quarry only 8000 boulders were drilled and broken to produce 159,810 tons of ore, thus giving a ratio of one drilled boulder for each twenty tons of mined rock.

Immediately following the war, when equipment was again available, the power shovels and trucks were replaced by more modern units. At the present time three 2½-cu yd shovels

and eight 17-ton rock trucks are employed at the Red Marble Quarry.

Run Drill Tests

Because of the harder rock encountered at this property, it was soon found necessary either to double the primary drilling crew and equipment or to change the system of primary mining.

The first method tested was that of drilling with a diamond drill. Rock in this test shot clipped 60° toward the free face with the strike parallel to this face. Fifty vertical holes were drilled on a 5½-ft square grid, varying from 15 to 20 ft in depth. Thirty-one horizontal holes were drilled to relieve toe. A powder factor of two tons of rock per lb of powder was employed. Top fragmentation resulting from this shot was fairly good but the bottom break was unsatisfactory. Better results would have been possible with larger diameter horizontal holes, whereby a larger amount of explosives could have been employed. Drilling costs, however, were appreciably higher than by the wagon drill method.

Larger diameter holes with greater spacing were then considered. Should the larger grid spacing fail to provide satisfactory fragmentation, any gain in primary breaking would be lost in greater secondary mining cost.

During 1950 two churn drill patterns were laid out. The first test was drilled on a 13 by 15-ft grid using six in. diam holes. A powder factor of 2.7 tons of rock per lb of explosive was employed. Fragmentation, resulting from this test, was not satisfactory. The second test employed two rows of churn drill holes with 14-ft burden and 15-ft spacing. Adjacent to this test shot a standard wagon drill pattern was also laid out for comparison purposes. The powder



First change in primary drilling was introduction of light wagon drills

factor for the churn drill holes was 3.3 tons of rock per lb of powder. Both patterns were shot simultaneously. Results from both methods were equal in fragmentation, as well as bottom break.

Try Rotary Drill

In January, 1951, a Joy Heavy-weight Champion 58 B H Rotary Drill was purchased. It was the second machine of this type to be used west of the Mississippi River. Accurate performance records have been continuously kept on the operation of this drill.

The drill is an electric-powered, crawler mounted self-propelled model. Three hydraulic jacks, operated from the cab, level the drill with the aid of two spirit levels. Air for removing the cuttings and cooling the bit is supplied by a 315-cfm air-cooled compres-

are either 20 or 30 ft long with 3½-in. A.P.I. threads.

The bit, most adaptable to our rock, is the Hughes Tri-Cone, Type W7R rock type. Average bit life at the property is 400 ft. Reconditioning of bits was attempted, without success. Bits are now run to failure.

Plan Blasting Practice

It has been found most economical to have engineers lay out all primary drill patterns, specifying the amount of explosives to be used and supervising the loading procedure.

Close grade control is necessary in our operations and all holes are sampled. Each drill pattern is surveyed and mapped. This serves the double purpose of an assay map and also to relocate holes in case of a cut-off or missed hole.

The drill pattern for 40-ft benches



Drills are often serviced under difficult conditions

sor mounted on the machine. A pressure of 60 psi is required from this compressor which provides an upward velocity of 3000 fpm in a 6¼-in. diam hole. Drill cuttings are collected at the collar of the hole by a Roto-Clone collector which separates the cuttings into a coarse and fine fraction. Cuttings are used for stemming and also provide a means of sampling.

Four forward and one reverse rotation bit speeds are available. Vertical pressure is transmitted to the bit by twin hydraulic cylinders. Normal operating pressure found suitable for drilling magnesite is 500 psi. This produces a total pressure of 22,000 pounds to the bit. Bit pressure can be changed to suit the drilling characteristics of the rock and is controlled from the operating cab. An automatic chuck grips the four in. square steel drill-rod. One set of jaws is used for downward pressure and the other set is for upward lift. The drill-rods

is a 15 by 18-ft grid and 47 ft deep. The holes are all 6¼-in. diam. Powder is purchased in five-in. by 25-lb cartridges. Approximate powder factor is 1.1 lb per cu yd.

As a precaution against cut-off in the hole and also to minimize back break, not more than three rows of holes are drilled for each primary blast.

Holes are detonated with primacord and all delays used with primacord connectors in the trunk lines. Usual practice is to initiate the blast on both ends and in the middle of the area.

During the first year of operation our machine had an availability of 61 percent. During this period we trained all operators, assistant operators, as well as all men who directly supervised the operation of the machine. In 1952 availability was 76 percent. Most breakdowns occurred in the rotary table and chuck assembly.

Drilling Speeds

A comparison for drilling speeds in this type of ground is as follows:

3½-in. wagon drills with 2¼-in. tungsten carbide bit—88 ft per gross shift

Diamond drills, taking an Ex core—40 ft to 50 ft gross

Churn drill, 6-in. bit—21.5 max. shift

Rotary drill, 6¼-in. bit—104 ft per gross shift

Net drilling rate was 18.88 fph for the past two years.

One noticeable advantage of this machine is its ability to drill through as much as 50 ft of dirt and mud overburden without the use of steel casing. The rotary action of the bit produces less vibration than percussion type drills, and seems to pack and stabilize the walls of the hole.

This drill has proved to be the most satisfactory method of primary drilling at this property. Yield per man shift has increased 37.9 percent in primary breaking and 11.2 percent in secondary breaking. Total increased efficiency over previous methods is 26.9 percent. In addition, the loading of a drilled pattern has been speeded up five times over previous methods.

Only three limitations have been found with the rotary drill. It is not possible to drill horizontal holes with the type of rotary drill which we employ and roadways must be provided over extremely rough terrain.

A wagon drill is better suited to both conditions than the rotary drill.

The third disadvantage is that bit life is greatly reduced when chert is encountered.

The rotary drill has been successfully used for a sufficient period of time to state unhesitatingly that it provides the most satisfactory method of producing primary drill holes in Washington magnesite.

WORKING DAZE





Prevention of just one mine fire makes any expenditure for fire fighting equipment truly worthwhile

Fire Fighting Equipment in Coal Mines*

**All Fires are Small at Their Beginning—It Is Important
to Have the Proper Equipment on Hand to Insure That
They are Kept Small**

TWO methods of approach to the fire problem have been adopted by fire-control authorities. One is known as fire prevention and the other as fire protection. The former is primarily concerned with precautions against starting fires and, to a lesser degree, with limiting the severity of fires. Fire protection deals with extinguishing or subduing fires already started and includes all types of equipment, materials and techniques used in fire fighting. A discussion of fire-prevention measures is considered a subject within itself and this report deals

only with the selection placement and care of fire protection equipment.

A discussion of the fire-fighting facilities adopted for underground coal mines throughout the world would be a lengthy and difficult undertaking. Available information indicates that regulations and practices in foreign countries are generally sketchy and indefinite.

The Federal Mine Safety Code and the Federal Coal Mine Safety Act have the following to say about fire-fighting equipment:

"Each mine shall be provided with suitable fire-fighting equipment, adequate for the size of the mine."

The terms "suitable" and "adequate" are subject to varied individ-

ual interpretations, and endless arguments are likely to develop in the absence of a guide.

Recommendations of the National Fire Protection Association,† 60 Batterymarch Street, Boston, Mass., are used extensively by the Federal, State and local Governments and by industry for choosing suitable and adequate fire-fighting equipment. These recommendations, where considered practicable, have been adopted. In addition, certain equipment and materials commonly used in coal mines have been recommended for fire fighting because they can be used successfully.

Three Kinds of Fires

Authorities on fire fighting agree that most fires can be subdued if they are attacked early; therefore, being prepared to attack a fire while it is incipient is a key protective measure. An extremely important point to remember in fighting mine fires is to attack from the fresh-air (intake) side when men are not adequately protected with respiratory devices.

It is essential that the fire classifi-

† A nonprofit organization used as a clearing house for all that is authoritative on the subject of fire prevention and fire protection. Hereafter, this organization will be referred to as the N.F.P.A.

* Extracted from Bureau of Mines Information Circular 7662 "Fire-Fighting Equipment in Coal Mines—Selection, Placement and Care," by W. D. Walker, Jr., William Eathorne, S. P. Polack and C. M. Keenan.

cation adopted by the N.F.P.A. be thoroughly understood before an attempt is made to provide fire-fighting facilities. The following explains the N.F.P.A. classifications.

Class "A" Fires—Class "A" fires are defined as those in ordinary solid, combustible materials, such as coal, wood, rubber textiles, paper and rubbish.

Fires of these materials can best be controlled through the quenching or cooling action of water or solutions containing large proportions of water. Chemical fire extinguishers, such as soda acid, foam and loaded stream, also can be used successfully on fires in this class. Other types of chemical fire extinguishers are somewhat limited in their effectiveness when used on Class "A" fires. Rock dust and fine sand may be used, but in some instances, such as overhead fires, these agents are difficult to apply.

Class "B" Fires—Class "B" fires are defined as those in flammable liquids, such as fuel or lubricating oils, grease, paint, varnish and lacquer.

Blanketing or smothering is essential for fighting this class of fire successfully. Chemical fire extinguishers, such as foam, dry chemical, liquid carbon dioxide, vaporizing liquid and loaded stream, are suitable. Rock dust or fine sand may be used also. In no case should water be used unless a "spray," "mist," or "fog" nozzle is provided. Class "B" fires are considered by fire-fighting authorities to be the most difficult to control; they are likely to spread rapidly.

Class "C" Fires—Class "C" fires are defined as those in (live) electrical equipment, such as oil-filled transformers, generators, motors, switch panels, circuit breakers, insulated electrical conductors and other electrical devices. A nonconducting extinguishing agent is essential for fighting fires of this class.

Chemical fire extinguishers, such as liquid carbon dioxide, dry chemical and vaporizing liquid, are suitable for fires in this class. Rock dust or fine sand may be used also, but either of these—the latter in particular—may damage electrical equipment.

When the electric circuit has been de-energized, the nonconducting recommendation previously mentioned may be ignored. However, when planning fire-fighting facilities for class "C" fire hazards this exception should not be given weight.

Every fire-fighting facility provided should be plainly marked so that its proper application to each class of fire can be readily determined.

Things to Consider

In establishing a fire-fighting program for a coal mine, the following points should be considered:

- (a) Number of men employed underground

- (b) Daily production of the mine
- (c) Area of the mine

The number of men employed underground is indicative of the number who may be exposed to danger from a fire, and the production and concentration of equipment have a bearing on the number of men employed in a given area. Therefore, these factors are given considerable weight. Mines are grouped here according to the number of underground employees or the tonnage produced in 24 hours.

Group 1—300 men or more, or 2000 tons or more

Group 2—Between 50 and 300 men, or between 300 and 2000 tons

Group 3—Less than 50 men, or less than 300 tons

The following fire-fighting facilities should be considered as minimum requirements in mines according to group size:

Group 1 Mines

- (a) Water lines, hydrants or hose taps, fire hose and nozzles
- (b) Truck-mounted water or chemical tanks, high-pressure rock-dusting machines
- (c) Hand-type fire extinguishers, barrels of water with pails, rock dust or sand
- (d) Miscellaneous fire-fighting materials and tools

Group 2 Mines

- (a) Truck-mounted water or chemical tanks, high-pressure rock-dusting machines. (There is no objection to substituting (a) under group 1 mines for this provision)
- (b) Hand-type fire extinguishers, barrels of water with pails, rock dust or sand
- (c) Miscellaneous fire-fighting materials and tools

Group 3 Mines

- (a) Hand-type fire extinguishers, barrels of water with pails, rock dust or sand
- (b) Miscellaneous fire-fighting materials and tools

A group 1 mine that is wet enough to reduce class "A" fire hazards may adopt truck-mounted water or chemical-tank requirements outlined for a group 2 mine in place of the water-line provisions. The substitution may cover the mine in its entirety or in part.

A group 1 mine that has water lines at the working areas but not elsewhere may adopt the truck-mounted water or chemical tank requirements outlined for a group 2 mine provided that twice the fire-fighting equipment recommended for a group 2 mine is made available.

A group 1 mine remote from a water supply, or where a water supply

is not reasonably available, may adopt the truck-mounted water or chemical-tank requirements outlined for a group 2 mine, provided that twice the fire-fighting equipment recommended for a group 2 mine is made available.

Placement of Facilities

Water lines should be available at the top and bottom of a main shaft or slope or at the mine portal and should extend along the main and secondary haulageways to all working sections of the mine. Water lines for fighting fires should be at least 2 in. in diam, and the reserve water supply should be at least 5000 gal. The pressure should be enough to permit a nozzle discharge of 50 gpm.

Where water lines are installed, hydrants or hose taps should be provided within 500 ft of the top and bottom of a main shaft or slope, or main portal and every working face. Also, they should be available at intervals not exceeding 500 ft along main and secondary haulageways.

The flowing water pressure at a hydrant or hose tap should not exceed 120 psi; pressure-reducing valves should be provided at the outlets to avoid bursting a fire hose where higher flow pressures prevail.

Where hydrants and hose taps are installed, fire-hose stations containing not less than 500 ft of hose should be within 500 ft of the top and bottom of a main shaft or slope or mine portal and in each working section. Also, they should be at intervals not exceeding 5000 ft along main and secondary haulageways.

Secondary fire-fighting equipment is advisable where water lines are available because the water-line system may be rendered useless.

Each truck-mounted water-tank unit designed to serve as a secondary means for fire fighting should have a 500-gal minimum capacity and at least 200 ft of 1½-in. fire hose fitted with a ½-in. nozzle. It should be equipped with a pump to maintain enough water pressure to deliver a minimum of 50 gpm.

Truck-mounted chemical-tank units may be substituted for truck-mounted water-tank units provided they are of equal value for fire fighting.

Where truck-mounted water-tank units are adopted as a primary means of fire fighting in group 2 mines, each unit should have a minimum capacity of 1000 gal. The water-pressure, delivery, fire-hose and nozzle specifications should conform to the group 1 mine recommendations for this type of equipment.

Truck-mounted chemical-tank units may be substituted for truck-mounted water-tank units, provided they are of equal value for fire fighting.

A high-pressure rock-dusting machine may be substituted for any truck-mounted fire-fighting unit pre-

viously described, provided it is fitted with at least 250 ft of hose and is kept close to the area to be protected. This substitution should be limited to 50 percent of the total mine requirement for truck-mounted facilities.

A mixture of 65 percent rock dust and 35 percent water, by weight, is more efficient than dry rock dust when applied to mine fires, but special attachments are needed to apply it.

Other Type Extinguishers

In every mine, suitable hand-type fire-fighting facilities should be readily available near the following locations to extinguish any fire at its very beginning.

- (a) Electrically operated equipment
- (b) Lubricant storage of over 10 gal
- (c) Welding equipment
- (d) Wooden ventilation doors
- (e) Working faces

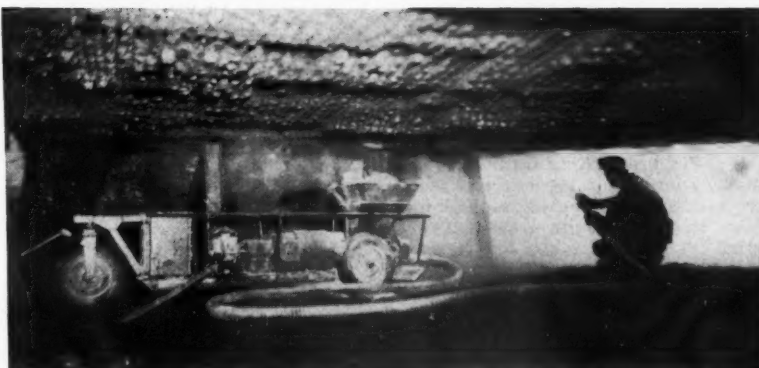
Any of the following electrically operated equipment should be provided with a hand-type fire extinguisher suitable for a class "C" fire.

Stationary Units

Transformers, oil-filled
Circuit breakers, oil-filled
Generators, converters, or rectifiers
Pumps
Fans
Hoists
Compressors
Belt-conveyor drives
Battery chargers
Shop equipment

Mobile or Portable Units

Locomotives
Continuous mining machines
Cutting machines
Drilling machines
Electric drills, portable
Loading machines



In addition to rock dust's value as an explosion preventive, it also serves well in fire fighting

Timber machines
Shuttle cars
Compressors
Rock-dusting machines
Portable pumps
Post pullers

All hand-type fire extinguishers used for mobile electrical equipment should be carried on the equipment or distributed throughout a working section so that an extinguisher of the proper size is always within 150 ft of the point where equipment is being operated.

In every mine, storage of miscellaneous fire-fighting materials and tools should be established within 500 ft of a main shaft or slope or mine portal and within 5000 ft of any working face. Every storage should contain an adequate supply of rock dust, boards, brattice cloth, shovels, picks, saws, bars, nails and concrete blocks or their equivalent. These may be preloaded to facilitate transportation. The storage should be established in a safe area, conspicuously marked, easily accessible, and free of obstruc-

tions that might interfere with speedy removal of materials or tools.

Fighting Belt Fires

In every mine where belt conveyors serve in the haulage system, the main and gathering belts should be provided with water lines, hydrants or hose taps, fire hose and nozzles or a sprinkler system installed in accordance with the specifications of the N.F.P.A.

Sprinkler systems, automatic or manually operated, are efficient devices for controlling fires at surface operations; however, their installation, application and care for effective operation are complicated. Because of this, standards for sprinkler systems have not been formulated. If such an installation is desired, the services of a competent fire-protection engineer or other person well informed on such installations should be obtained.

When nonflammable belting of proved worth is used, the above recommendations for waterline or sprinkler facilities may be disregarded, provided one of the following hand-type fire extinguishers is made available at intervals not exceeding 300 ft along the belt:

Pump tank (water).....	2½-gal
Gas pressure (water).....	2½-gal
Soda acid.....	2½-gal
Foam	2½-gal
Loaded stream.....	1½-gal
Barrel of water and 3 pails.	

Three sacks of rock dust may be substituted for a hand-type extinguisher at alternate locations.

Although belt-conveyor drives were discussed previously as electrical installations, it is believed that they merit further discussion because of the extra-hazardous fire problem they present. The hand-type fire extinguishers adopted at any of the electrical equipment actuating a belt-conveyor system should be stored not more than 50 ft away from the electrical installation and on the intake-air side. Conspicuously marked cab-



Readily portable fire extinguishers should be available for quick use at the face

inets should be provided for storing the extinguishers, and at least six sacks of rock dust and two shovels should be on hand to augment each extinguisher.

Care of Facilities

Care of fire-fighting facilities is extremely important. A defective facility may mean falling below the minimum standard for fire protection in a mine. This essential is likely to be overlooked, since such equipment is used infrequently.

Following are the minimum precautions that should be taken; and where atmospheric or other conditions are unusually poor, more stringent precautions are advisable.

Leaks in a waterline, hydrant, or hose tap should be promptly repaired. Protection against freezing should be provided where necessary; and pressure gages should be installed, or available, for checking the water pressure frequently at strategically located hydrants or hose taps.

Cotton, rubber-lined hose is the standard fire-department hose for general outside use in the United

States and Canada. It is available with single, double, or triple jackets treated to withstand mildew and repel water. Water should be passed through this type of hose at least four times a year to keep the rubber lining in good condition.



Hand-type extinguishers should be placed near conveyor drives

States and Canada. It is available with single, double, or triple jackets treated to withstand mildew and repel water. Water should be passed through this type of hose at least four times a year to keep the rubber lining in good condition.

Unlined linen hose is primarily used for short lines inside of buildings because it is not affected by ordinary room temperatures and because it is light weight, compact, and easily managed by one person. However, holes quickly chafe through when it is laid over sharp-edged or abrasive materials or around corners. It will rot or mildew if left even slightly damp in storage and for this reason it is not ordinarily water-tested. Visual inspection should be relied upon to determine if the hose is satisfactory.

Fire hose stored on reels, racks, or in cabinets should be stretched out once every three months to change the folds and prevent kinks from being in a set position too long. All hose should be thoroughly dried after every use.

Immediately after use, water-tank units should be refilled and chemical tank units should be recharged. All tank units, water or chemical, should be flushed and recharged once every six months.

Most incipient fires can be extinguished or subdued by prompt use of suitable hand-type fire-fighting facilities and recommendations for the proper care of such facilities should be rigidly carried out. N.F.P.A. recommends that damaged extinguishers should be repaired only by the manufacturer.

Pump Tank—Clean water, reasonably free from acids or alkalies, should be used for charging, and the extinguisher should be discharged once every six months. It should be recharged immediately after use. Freeze protection may be provided by adding a designated amount of spe-

cially prepared calcium chloride to the water charge.

Gas Pressure—The carbon dioxide cartridge used for expelling the water should be recharged by the manufacturer. Once every six months the extinguisher should be discharged. It should be recharged immediately after use.

Loaded Stream—Charge according to the manufacturer's instructions. A supply of the alkali-metal salt solution used in this extinguisher should be kept on hand for recharging. Spare carbon dioxide cartridges used as an expelling medium should also be kept on hand. Recharge after use. The alkali-metal salt solution does not deteriorate; therefore, periodical discharging is unnecessary. However, the pressure cartridge should be

checked by weighing once every six months. Freeze protection is unnecessary.

Soda Acid—Charge according to the manufacturer's instructions. Once every six months the extinguisher should be discharged. Recharge after use. A hydrostatic test should be made every five years. The only satisfactory freeze protection for this type of extinguisher is a heated cabinet.

Foam—Charge according to the manufacturer's instructions. Once every six months, the extinguisher should be discharged. Recharge after use. A hydrostatic test should be made once every five years. The only satisfactory freeze protection for this type of extinguisher is a heated cabinet.

Liquid Carbon Dioxide—The extinguisher should be charged by the manufacturer or a reputable firm that specializes in charging this type of extinguisher. Once every six months, the contents should be checked by weighing. Recharge after use. A hydrostatic test is necessary every five years. Freeze protection is not necessary.

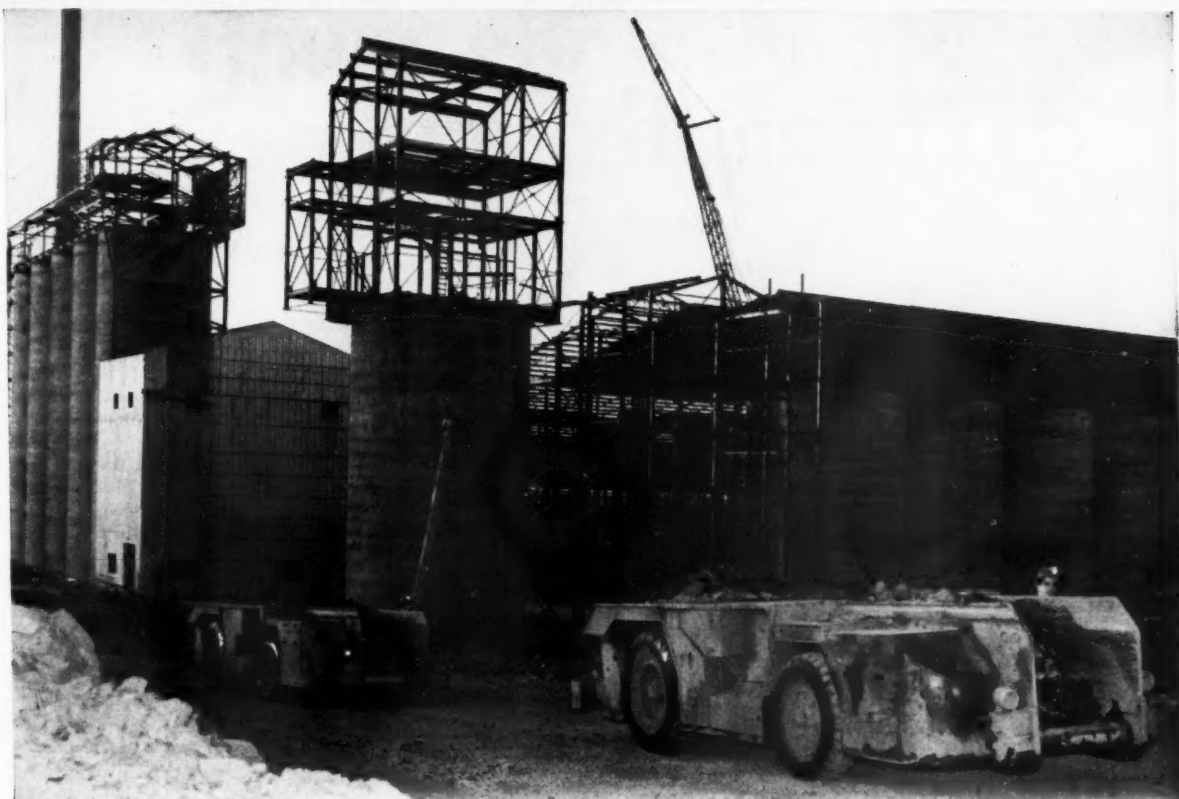
Dry Chemical—The dry chemical (powder) used in this type of extinguisher should be as specified by the manufacturer. In types using a pressure cartridge for expelling the powder, the pressure cartridge should be checked by weighing every six months. Types fitted with a built-in pressure gage to indicate the pressure charge may be checked by observation. Once every six months, this type of extinguisher should be turned upside down and shaken gently to loosen the powder charge. Freeze protection is not necessary.

Since there is some likelihood that on underground fires the extinguisher might be used in confined places or in the return-air side, a carbon tetrachloride extinguisher is not recommended and any of them in use should be removed as soon as practicable and replaced with liquid carbon dioxide or dry chemical types.

Conclusion

It is a well-established fact with underground fires, as with those on the surface, that measures must be applied quickly to prevent incipient fires from spreading. The record of fires in coal mines shows that in many instances facilities for combatting incipient or widespread fires were very meager or lacking entirely.

This guide was prepared to assist those in the coal-mining industry charged with the responsibility of preventing the loss of life in underground operations. REMEMBER, EVERY MINUTE COUNTS FROM THE MOMENT A FIRE STARTS, AND EVERY MINUTE WASTED MAY RESULT IN LOSS OF LIFE.



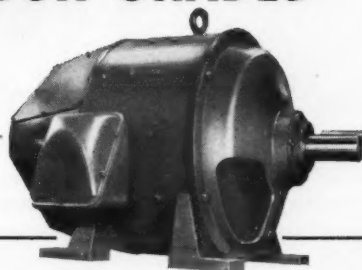
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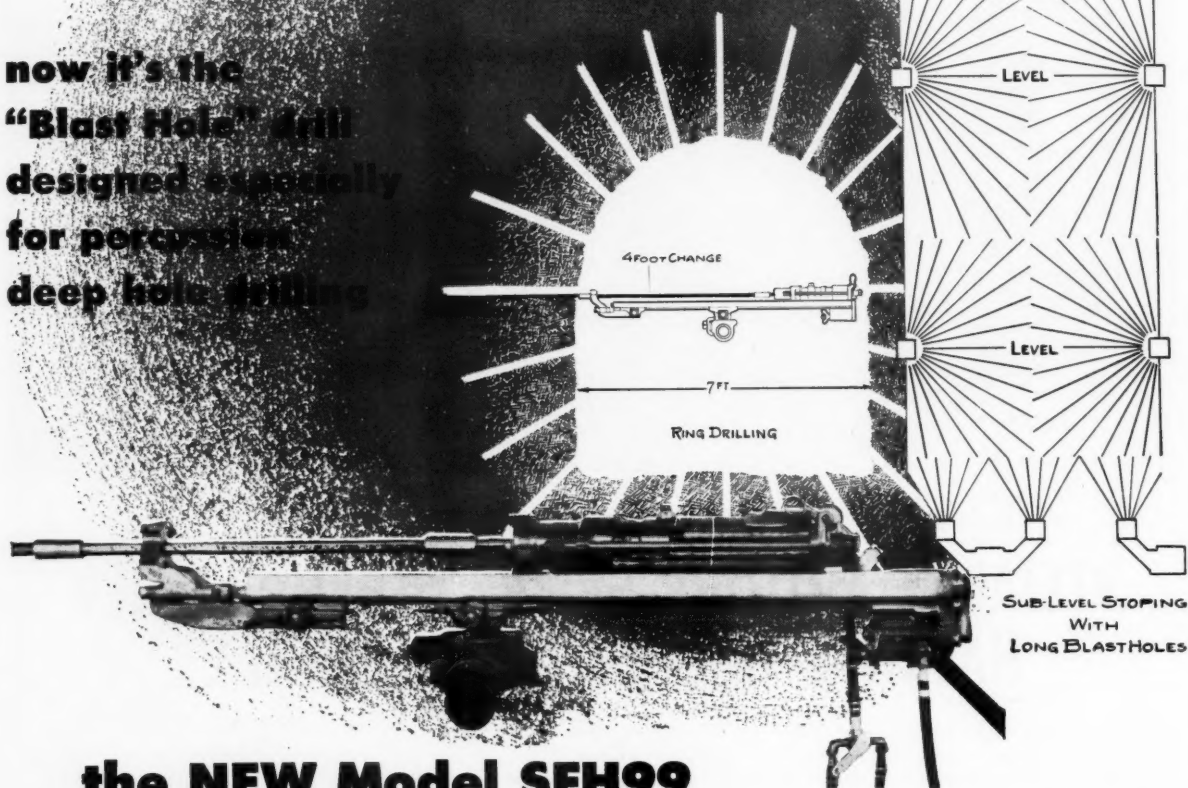
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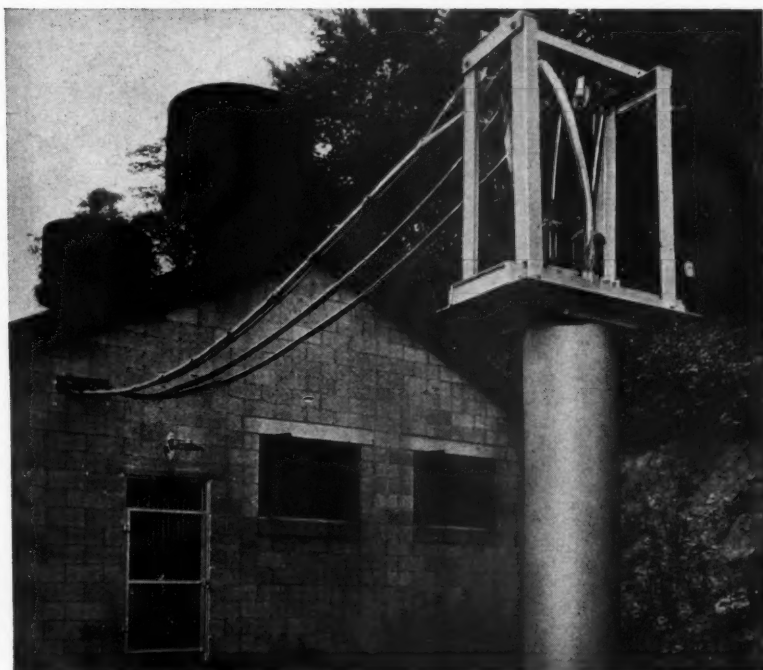
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Down come costs.....

with U. S. aluminum borehole cable

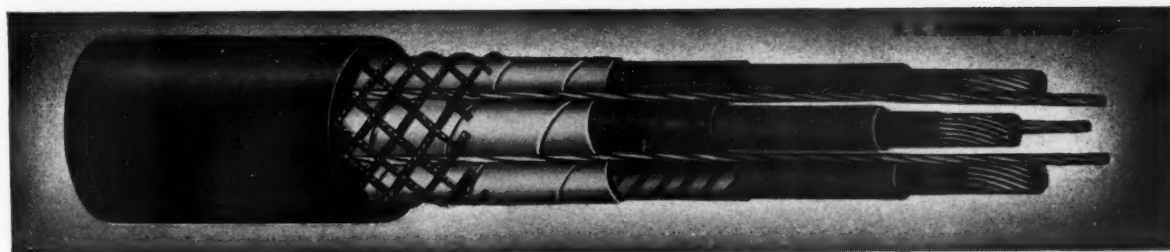
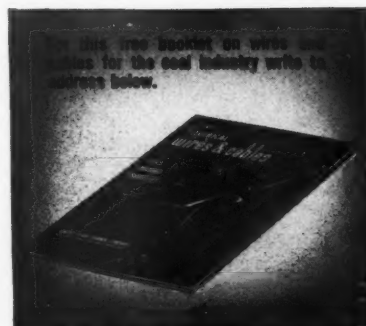
● Insulated aluminum cable costs *less* than copper cable and *far less* than armored copper cable. Aluminum needs no supporting armor because it can easily support its own light weight in boreholes of great depth. A 500,000 CM insulated aluminum cable is *less than half* the weight of an identical copper cable. It is furthermore easier to handle and its light weight speeds up every operation connected with its installation. It also makes possible fewer, simpler lower-cost supports.

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	R Copper	RH Aluminum	R Copper	RH Aluminum	Copper	Aluminum
2/0.....	225	222	541	274	0.0842	0.134
4/0.....	300	302	816	380	0.0525	0.0843
500,000.....	515	520	1,831	787	0.0222	0.0357
750,000.....	655	660	2,716	1,129	0.0148	0.0238
1,000,000.....	780	785	3,546	1,437	0.0111	0.0178
1,250,000.....	890	895	4,400	1,699	0.0089	0.0145



UNITED STATES RUBBER COMPANY

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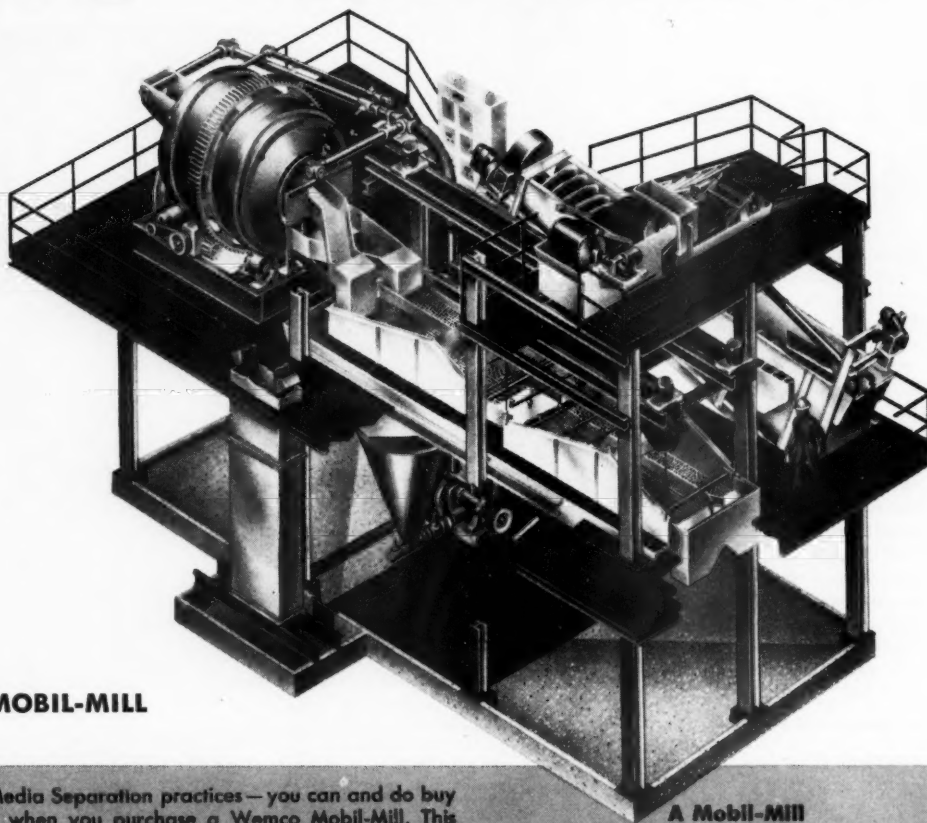
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Write for Bulletin M-3-M-4 containing further information on Mobil-Mill applications to coal cleaning problems.

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MINING CONGRESS JOURNAL



More than 1200 convention goers enjoyed the food, fun and entertainment at the Annual Banquet

Seattle Convention Success

Some 2000 Mining Folk Consider Industry Problems; Meet Solons; Have Fun

THE American Mining Congress' 1953 Metal and Nonmetallic Mining Convention held for the first time in Seattle, Wash., exceeded expectations in every respect. Some 2000 mining men and ladies from every part of the United States, were present during the four-day meeting. Among them were prominent legislators and government officials, miners and presidents of mining companies, prospectors and scientists. All were drawn to the Northwest's Queen City by their common interest in mining's legislative, economic and operating problems.

Included in the attendance were 18 members of the United States Senate and House of Representatives, keenly interested in the American mining industry. Alaskan and Canadian mining were well represented.

The National Program Committee under Philip R. Bradley, Jr., showed excellent judgment in selecting the topics and inviting speakers to discuss the problems uppermost in the

minds of mining men. The program they developed included a total of 14 comprehensive sessions. Five of these dealt with such topics as National Problems Affecting Minerals, Public Lands, Tariffs and Taxation, Labor Relations and Manpower and the New Horizons for Minerals. Four

operating sessions included Advances in Mechanization, Drilling and Blasting, New Mining Developments and Open Pit Mining. At a well attended luncheon meeting on Tuesday, the Strategic Minerals picture was considered and Wednesday afternoon was given over to five special sessions during which Gold, Silver and Monetary Problems, Nonmetallic Minerals, Developments in Prospecting, Advances in Milling and Metallurgy, and Uranium Mining and Processing were discussed. All sessions were



Gov. B. Frank Heintzleman spoke on Alaska's development



well attended and at some there was "standing room only."

For the opening of the meeting Monday morning until the last session was ended Wednesday afternoon, there was not a single letdown in the uniform high quality of the papers presented nor in the manner of their delivery. To give our readers the essence of their contents we have printed abstracts of each paper on pages 57 to 100 of this issue.

First Session Sets Pace

The opening session of Monday morning was devoted to addresses by Hon. Arthur E. Flemming, Administrator of the Office of Defense Mobilization and Hon. Felix E. Wormser, Assistant Secretary of the Interior.

Warning that we are in the midst—not of a year or a decade—but of an age of peril, Mr. Flemming outlined a plan of action for our survival as a nation. He also reviewed what the present administration has accomplished toward putting this plan into action.

"Under the leadership of President Eisenhower," he said, "our mobilization program will move forward and as it moves forward will surmount obstacles that up to now have been regarded as insurmountable."

He pointed out that savings can be made in defense expenditures, through application of sound principles of management, without reduc-

ing the quality of the product. "As a result," he concluded, "America will deal with Communism not from a position of weakness but from a position of strength."

Mr. Wormser asserted we should have a clearer national policy regarding the production and utilization of our mineral resources. He enumerated certain fundamental premises upon which such a policy should be based. He said national minerals policy should: first, contribute to a strong and vigorous domestic mining industry by intensifying exploration, discovery and full use of our mineral resources; second, serve to promote the national interest yet be consistent with an enlightened foreign economic policy and third, look toward greater freedom of the market place—a maximum of free enterprise. After outlining the means to these ends he declared, "We must move in a direction that will preserve the freedom we enjoy under our unique political system and by our actions convince others that this represents

the greatest strength of civilized man."

With these two addresses setting the pace, each of the following sessions took up one or more of the expressed or implied ramifications of our national minerals picture and by means of prepared papers, extemporaneous talks, questions and answers extracted the last morsel of meat from each topic.

Declare Policy

At appropriate points throughout the meeting, statements defining the policy of the mining industry on the subjects at hand were introduced by the Resolutions Committee. Upon adoption by the convention these became part of the policy guide, which the industry will follow in its dealings with Government during the months ahead. The full Declaration of Policy is reproduced on pages 51 to 56 and represents the unified views of the mining industry on these all-important points.

Lest there be even a remote chance



R. M. HARDY
Chairman
Western Division



P. R. BRADLEY, JR.
Chairman
Program Committee



The Spanish Ballroom was filled to overflowing for the Welcoming Luncheon

that they be misunderstood each resolution was carefully drawn up and its every facet carefully considered by the Resolutions Committee headed by Kenneth C. Kellar of Lead, S. D. The industry owes a vote of thanks to these hard working committeemen for the fine service they have rendered—first, in taking the pulse of the industry; second, in putting the sense of what they learned into strong and unequivocal language; and third, in considering every proposal made for inclusion in the declaration.

Welcoming Luncheon

With Robert M. Hardy, Chairman, Western Division, American Mining Congress, presiding, the Welcoming Luncheon on Monday, September 21, was a momentous occasion. Acting Mayor of Seattle, David Levine addressed the crowd of mining men and ladies and bade them welcome to Seattle. Lieutenant Governor E. G. Anderson welcomed them all to the State of Washington. Both gentlemen expressed the hope that the mining folk would return for other visits to the Evergreen State.

In the absence of President Howard I. Young Vice-President Andrew Fletcher, president of the St. Joseph Lead Co., responded for the American Mining Congress. He pointed out that one of the important questions to be considered at the meeting was, "Do we or don't we want a lead-zinc mining industry in the United States?" and gave a summary of the critical situation facing this important branch of the industry. He expressed satisfaction that the Government is formulating a realistic mineral policy for the country. He concluded by thanking the Mayor and Governor for their warm welcome, and the people of the Pacific Northwest for their hospitality.

Philip R. Bradley, Jr., Pacific Min-

ing Co., in his response as National Program Chairman, emphasized the new note in the convention program. This, he said, was due to the fact that the mining industry, no longer facing hostility, can examine its weak points in public, strengthen them, and in so doing, improve its over-all position. He expressed special appreciation for the cooperation ex-

tended by the State Chairmen and members of the Program Committee.

L. C. Campbell, vice-president, Eastern Gas & Fuel Associates, brought greetings from the Coal Division of the Mining Congress. He also hailed the new interest of Government in a national mineral policy calculated to help rather than hinder our country's economic health.

John P. Courtright, president, Marion Power Shovel Co. and Chairman of the Manufacturers Division, paid tribute to the cooperation between operating men and manufacturers so evident in the work of the American Mining Congress.

Chairman Hardy thanked the local committees for their fine work which had contributed to the successful arrangements for the Convention including the welcoming of visitors, the splendid press, radio and TV publicity, the outstanding program of trips, the Salmon Derby and the special ladies' entertainment program organized by Mrs. Robert M. Hardy, who received a special round of applause. He concluded by introducing the many distinguished guests at the head table.

Salmon Beware!

For the 126 hardy souls who got up early on Tuesday and Wednesday



Of the 126 hardy fishermen and fisherwomen who vied for fun and glory in the AMC Salmon Derby, ten qualified for prizes. Pictured at the right are three of the ten lead loving cups awarded to these winners. In addition, first, second and third prize winners each day received generous supplies of canned Puget Sound salmon





An attentive audience learned about latest advances in mine mechanization on Monday afternoon

morning, the Salmon Derby was an unqualified success. Both those who caught some of the silver salmon and those who just had "fisherman's luck," enjoyed getting wet and were ready for a hearty breakfast plus a warming draft.

First prize winner was John Quine, Assistant Attorney General for the State of Washington. His prize-winning catch weighed seven lb and 12 oz. The other prize winners were: Clyde W. Gillan, U. S. Smelting Refining & Mining Co.; Mrs. C. O. Dale, Eagle Picher Co.; Arch Sproul, Stearns-Roger Mfg. Co.; J. A. Hall, Kansas City Structural Steel Co.; R. V. Pierce, mining consultant; Mrs. M. Way, Wah Chang Corp.; Mrs. J. M. Jones, National Wool Growers; A. F. Kroll, Bunker Hill & Sullivan Mining & Concentrating Co.; M. DuBois, U. S. Smelting Refining & Mining Co.

Each of the ten winners was awarded a unique lead loving cup, appropriately inscribed, donated by Bunker Hill & Sullivan Mining and Concentrating Co. and its subsidiary the Northwest Lead Co. In addition to the loving cup, the first, second and third prize winners each day received as an additional award a liberal supply of canned Puget Sound Salmon.

The Salmon Derby Committee composed of Co-chairmen Clyde Holcomb and Roger Cutting aided and abetted by Noel Rose, George Thompson, Stan Harrison, Harry Von Eschen and a crew of enthusiastic volunteer workers, should be commended on an excellent performance.

Gay Times

While just the 126 early risers enjoyed the Salmon Derby, other social events on the program were enjoyed by many more of the mining men and ladies. On Monday night the Miners' Jamboree was a brilliant pot-pourri of dinner, dancing and top-notch entertainment, all combined to make a full evening of fine entertainment for the 1100 who were there.

On Wednesday night the Annual Banquet in the beautifully decorated and lighted Civic Auditorium was the climax of the convention proper. There were 1200 merrymakers including mining men, Congressmen and

Senators and their ladies. A holiday mood pervaded the huge building and the music and entertainment kept this at a high pitch throughout the evening. Donald H. McLaughlin introduced the distinguished group at the head table as only he can and the only complaints heard at the end of a long evening were that it was all too short.

All Aboard for Trip Abroad

Bright and early on Thursday morning some 450 conventioners

were on board for a trip to Victoria, B. C., when the S.S. *Princess Patricia* pulled away from the dock. About four hours later the Argonauts descended on the Empress Hotel in Victoria for lunch, following which buses were on hand for a tour of this unusually beautiful city. The gardens were in colorful bloom against a background of the greenest grass ever seen.

Shopping expeditions to the china shops and woolen stores were the order of the day after the bus ride. At boat time the voyagers trooped back on board the S.S. *Princess Marguerite*, laden with booty, for the ride through the gloaming to the lights of Seattle, and so to bed.

No account of the fine trips program worked out by Chairman Sam Strohecker and his well organized team of local folk would be complete without mention of the pre-convention trips on Sunday, September 20.

A goodly number of early arrivers took advantage of the opportunity to visit the Bremerton Navy Yard. In the afternoon a bus and several pri-



Secretaries of state mining associations discussed solutions for their common problems



Western Division Board of Governors met to discuss future convention plans and elect officers for next year

vate cars carried some 40 or 50 persons to the University of Washington Campus, for a tour of the laboratories of the School of Mineral Industries and the Northwest Experiment Station of the U. S. Bureau of Mines, plus delicious cakes and cookies made and served by the wives of the faculty and students.

On Friday following the meeting a group visited the Boeing plant near Seattle where, from all reports, they were welcomed with open arms and treated to an unforgettable tour of this great aircraft factory. Some elected to visit the modern plants of the Bethlehem Steel Co. or the Northwest Lead Co.

By Friday afternoon all but a few conventioners had left the city for the points north, south or east they call home, content to wait for the AMC Convention next year.

State Secretaries Confer

On Sunday morning preceding the Convention, representatives of state mining associations met over breakfast to discuss cooperation in solving their common problems. Under the chairmanship of Frank N. Marr of the Northwest Mining Association, attention was given to proposed revision of the Federal mining laws as they affect the Public lands and to the conflicts between uranium mining claims and oil and gas leases.

Considerable time was also given over to consideration of the lead-zinc

tariff question and to tariff aid for other domestic mining industries hard hit by foreign imports.

Board of Governors Meet

At noon on Wednesday the Board of Governors of the Western Division met. Donald H. McLaughlin, president, Homestake Mining Co., was unanimously elected Chairman for 1954. He will play a leading role in developing plans for the 1954 Convention and Exposition to be held in San Francisco. Also duly elected were candidates for the Board of Governors nominated by the various state associations.

An invitation from Las Vegas, Nev., to hold the 1955 Convention there was warmly received as were those from Denver and Salt Lake City for the 1956 and 1957 meetings.

Ladies Program

All social functions and the trips mentioned so far were open to men and ladies alike, but there was also a special program designed for just the ladies. Mrs. R. M. Hardy and her Ladies Committee left no stone unturned for the entertainment of the visitors on the distaff side.

The Mermaid Cruise on Monday, with the trip through the locks and view of Puget Sound, started a little late but the adventures of those who went added to the enjoyment of the trip. The visit to Seattle Art Museum with its world famous jades

and the style show and trip behind the scenes at Frederick and Nelson's made Tuesday a memorable day. The Hawaiian Luncheon at the famed Sunset Club on Wednesday was a revelation to all. The delicious, exotic dishes and Hawaiian music served to point up the colorful decorations and the surprise children's style show on the stage.

No mere man could do justice to the color and appointments the Ladies Committee provided. Suffice it to say here, a "fabulous" time was had by all.

It's San Francisco in 1954

The great Mining Congress Convention of 1953 in Seattle, Wash., is past now. Not enough can be said about the great work done by the local committees under "Bob" Hardy's leadership to make it an outstanding success. Their efforts will long be remembered by the mining men and ladies who were present.

All eyes will now turn toward San Francisco. There, from September 20 to 24 will be held the 1954 AMC Metal and Nonmetallic Mining Convention and Exposition. On view, many for the first time, will be all the latest mining, milling and metallurgical machinery and supplies. There, mining men, government officials and legislators will meet again to review the advances of the past year and plans for the future of the American mining industry.



San Francisco will be host to miners in 1954

AMERICAN MINING CONGRESS

A Declaration of Policy

Adopted at Seattle, Washington, September 21-23, 1953

COMMUNISM continues to threaten the liberty and security of all persons living in the free world. International cooperation in the strengthening of military defenses is encouraging. But military strength rests upon economic strength. A vigorous and expanding mining industry is of paramount importance. The continued strength of our industry, with a high level of capacity, should be the constant goal. Ever increasing standards of living, at home and abroad, and ever increasing economic strength are the best defenses to the sinister forces of communism and socialistic philosophies.

Since it is recognized that the production of the mining industry is essential to national security, we call attention to the startling fact that for years the Federal Government has lacked a constructive domestic mineral policy. We urge that this serious defect be corrected and that such a policy be adopted and announced.

Progress is being made toward the removal of government restrictions upon our national economy, the curtailment of Federal expenditures, and the elimination of public waste, extravagance and corruption. We commend those responsible for these accomplishments.

In order that our country may be made safe from the dangers which confront us, we urge an even more vigorous program to remove communists in Government, in labor unions or wherever else they may threaten our security; to control expenditures, and to reduce taxes and effect monetary reforms. The Taft-Hartley Act should be strengthened to afford greater protection to the individual worker and the public.

GOVERNMENT EXPENDITURES

Government expenditures should be made to the extent, and only to the extent, necessary to meet essential functions of government (including defense) adequately and efficiently, honestly and fairly, without waste or extravagance, without political favoritism, and without regard to local or group pressures. We commend what the

Administration and the Congress have done toward this end and urge unremitting attention to the achievement of these standards.

A balanced budget is desirable and should be attained, but we cannot rely on budgetary balance for a particular year as the test of propriety or need of expenditures. The standard for expenditures should be that of minimum expenditures necessary to achieve essential results for effective preparedness or other real needs. Excessive or unnecessary expenditures for any purpose should be eliminated. Activities and projects not now essential should be curtailed, deferred or eliminated. Commitments of open balances of prior appropriations should be reviewed and subjected to these same standards. The essential needs for the present and the immediate future, the vast commitments against prior authorizations (for which funds have not yet been provided), and our heavy government debt, are so great that they leave no place for extravagance, waste or unnecessary expenditure. Citizens and organizations, the Administration and the Congress, should not ask or permit any violation of these standards. All should insist that such standards be observed.

Congress must have a competent staff to review and consider requests for appropriations and to assist it and its committees in carrying out these principles. We commend what has been done by Congress along this line and urge the further action necessary fully to meet the need.

It is the joint duty of the Congress, of the Administration, and of the citizens to see that the financial house of the Government is placed in order.

TAXATION

Our Federal tax system must be revised as to its basis, its policies and its rates, if it is to continue to yield the revenues needed and permit the continuance of the system of private enterprise and individual initiative under which our country has developed its great resources, its productivity, and the prosperity and welfare of its people.

Where substantive provisions or tax rates are such as to leave little or no incentive for creation of income, the provisions should be amended and the rates reduced. Tax revenues must flow from a dynamic productive economy, from the production it yields, the employment it gives, and its use of materials and services; and our tax system should be such as will not block that flow.

Taxes should be imposed and administered fairly, equitably and honestly, in accord with Congressional intent. We commend what Congress and the Administration have done and are doing to improve our system of taxation along these lines. We commend not only Congress for bringing to light corruption and mismanagement in our tax administration, but also the Treasury and the Commissioner of Internal Revenue for what they are doing to insure proper administration and application of the law.

The Congress has recognized that development of new mineral resources and increased production from existing mines is essential for defense and for industrial use. We appreciate what Congress has done to remove road blocks to adequate productivity, but emphasize that further measures are still needed, including the following:

Present limitations on deductibility of exploration expenses should be removed.

Tax exemption should be granted a new mine for three years after beginning of profitable operations.

Depreciation should be more adequately allowed. Depreciation claimed by the taxpayer should not be denied unless clearly unreasonable in amount and in method. Technicalities should not prevent a reasonable recovery and the tax benefit rule should be fully applied. Early recovery of inflated replacement costs should be permitted.

Losses of loss years should be computed on the same basis as taxable income; and deductions for percentage depletion and credits for dividends should not be denied either in the year of loss or in the year against which the loss is applicable.

In taxing the stockholder on dividends received, allowance should be made for taxes paid by the corporation; and depletion should be carried through to the stockholder.

Capital gains should be taxed at more moderate rates.

The over-all rate on income of the individual or the corporation should in no case exceed 50%.

Greater incentive for the creation of income and greater revenues to the Government will result if these recommendations are adopted. Investment in high risk enterprises such as mining is to be expected only if the investor can see opportunity to recover his capital and receive a return commensurate with the risks assumed. Unless there

is incentive for investment and effort the Government will lose the revenues resulting from such activities, from the employment they give, the purchases they make, and the flow of their production through our economy.

Capital expenditures should be encouraged not merely for the future incomes they may be expected to create, from which the Government will derive revenue, but also because, when made, they represent payrolls, purchases and incomes to others from which the Government will currently derive revenue.

We recommend the immediate repeal of the Silver Bullion Transfer Tax. Its original purpose, whatever its justification and validity, has long since disappeared.

Our Government should cooperate with each foreign government which sincerely wishes to attract the investment of private funds and to encourage private enterprise by the creation of the necessary climate and the removal of barriers and road-blocks. Fears of confiscation, monetary controls and restrictions, excessive taxation, and other economic and political barriers created by other countries must and can be removed. To this end our Government should enter into a mutually satisfactory treaty with each such country.

If the effort to encourage the investment of private funds and to promote private enterprise abroad is successful, it will mean stability, prosperity, and higher standards of living, health, and education for our friends abroad; and, for us, a replacement of government aid by private investment, a direct saving in dollars for our Treasury, and increased revenues from increased economic activity.

With respect to other countries, the elimination of discriminatory taxes and of double or multiple taxation, through tax credits and treaties, should be continued.

PUBLIC LAND POLICY

Our Federal mining laws providing for the location and patenting of lode and placer mining claims are based upon the premise that minerals in the public domain should be discovered and developed by private enterprise and that, as an incentive and reward for their discovery and development, title to the land should be transferred to private ownership.

Under the location system established by these laws, minerals in the public domain have been

discovered at a rate, and developed in a thorough manner, without parallel in history. This system has been the basis for the production of those raw materials so essential to our economic well-being and so vital to our national defense. As never before, our mining laws and the administration of them must be conducive to the continued maintenance and development of our mineral industry.

We are opposed to any material interference with the system of locating and patenting mining claims and to any changes in the basic principles of our Federal mining laws. We deplore attempts to obtain rights under mining locations which have lacked either validity or good faith. Adequate remedies have been and are available to prevent benefits under invalid locations, and we again urge that they be used vigorously. Clarifying and strengthening amendments to the mining laws could minimize the incentive to make mining locations for purposes other than prospecting, mining or processing operations, without destroying the fundamental benefits of the location system and retarding the continued growth of our mining industry.

We recognize that the co-existence of two systems for acquiring rights to prospect for and remove the mineral resources of the public domain—one under the general mining laws and the other under the Mineral Leasing Act of 1920—have resulted in conflicts. We believe that the conflicts in these two systems should be carefully reviewed and an effort made to remove them, so as to eliminate, insofar as possible, any restriction of opportunity for development of our mineral resources, while leaving intact the basic principles and fundamental benefits of our system of mining locations.

We pledge our cooperation in a study of problems affecting other users of the public domain.

TARIFFS

Despite progressive increase in imports, the Nation must still look to its own reserves for the major portion of its mineral supply.

Experience has shown that our country should not be left dependent on foreign ore reserves as a source of supply in an emergency, however important it may be to import some metals and minerals to supplement domestic production and to fill our stockpile with materials in which we are deficient. World political conditions as well as the hazards of possible air and submarine warfare support this conclusion.

We recommend, therefore, that Congress exercise its authority over tariffs to be administered for the welfare of the American people and provide reasonable protection when needed against competition from low foreign wages and depreciated currencies.

We endorse the principle of a flexible tariff to safeguard against the dumping of imports, such as has caused unemployment and heavy financial losses in the domestic lead and zinc mining industry during the past year. We believe that such a tariff will serve to provide greater market stability and thus protect both consumers and producers from the hazards of alternating periods of shortages and oversupply.

We oppose inter-governmental commodity agreements that call for control over industry, or involve international regulation of production, distribution and prices.

National security requires a healthy domestic mining industry with ample productive capacity and experienced working forces. Our greatest protection is industrial strength. We recommend maintenance of the fullest possible capacity for production of strategic and critical metals and minerals within the United States.

STOCKPILING

We recommend a national policy of stockpiling strategic and critical materials on a permanent basis, and the provision of adequate funds at all times for orderly purchases for possible emergency needs. As long as the security of the free world is threatened, the Nation's stockpiles must be filled.

We approve and have urged consistently the stockpiling of metals and minerals essential for defense and emergency needs. But we believe the most efficient and economical procedure is to stockpile at times like the present, when output exceeds demand, and that it is in the national interest to reduce or suspend stockpiling purchases during periods when critical shortage of metals causes dislocation of production in defense and essential industries.

We recommend that no withdrawals from stockpiles be authorized except in a declared emergency when national security clearly requires release of a particular material. All metals and minerals acquired pursuant to the provisions of the Defense Production Act which are excess to the needs of programs under this Act should be transferred promptly to the national stockpile.

and should be subject to withdrawal only under like conditions of a declared emergency.

We deplore discriminatory practices favoring foreign purchases of metals and minerals for stockpiling, and urge that Government agencies afford domestic mines at least the same price and other considerations and advantages as are given foreign production by our Government.

The continued operation of prospectors and small mining concerns is important because these smaller operations provide a pool of specialized knowledge and trained manpower available for the expansion of minerals production in the event of an emergency. Their activities also are the source of new mine discoveries of consequence.

LABOR RELATIONS

Less than a year ago the electorate expressed emphatically its desire to return to sound principles of government. Inherent in that expression was a rejection of political bossism in any form. Nevertheless, in the field of Federal labor legislation there has been evidence that the appeasement of labor leaders may still be a dominant factor in the formulation of national policy. The political forces which would lead the nation down the inevitable path to socialism under a labor government continue to exert relentless pressure on our national leadership. Their immediate objective continues to be the weakening of the Taft-Hartley Act.

Our great bulwarks of free enterprise and individual liberty can be as readily destroyed by the appeasement of socialist forces at home as by the appeasement of communist forces abroad. To the extent that national leadership appeases on either front, the fundamental institutions of our nation are threatened.

We vigorously oppose the following suggestions for amendment of the Taft-Hartley Act:

1. To permit further extensions of the principle of compulsory unionism under governmental sanction;
2. To outlaw State laws regulating or prohibiting compulsory unionism;
3. To eliminate any safeguard against communism in unions;
4. To permit replaced economic strikers to vote in representation elections;
5. To relax the prohibitions and procedures against secondary boycotts;
6. To qualify the exemption of supervisors;
7. To reduce union responsibility;

8. To relax limitations on the check-off;
9. To permit unilateral administration of welfare funds by unions; and
10. To encourage strikes during contract negotiations.

It is essential that the task, commenced in 1947, of establishing a fair code of labor legislation be completed. To this end we again urge that the Act be amended to:

1. Prohibit compulsory unionism in any form;
2. Prohibit labor monopolies and industry-wide bargaining;
3. Uproot communistic influence from the internal affairs of the unions;
4. Require the President, in threatened national emergency strike or lockout situations, to utilize the provisions of the Act;
5. Safeguard, from union encroachment, the functions of management and the rights of workers;
6. Effectively outlaw mass picketing, violence, intimidation and similar terroristic devices in labor disputes;
7. Effectuate the requirement that decisions of the National Labor Relations Board be based upon the preponderance of evidence;
8. Restore stability to labor agreements.
9. Preserve to the States their right to regulate strikes and picketing; and
10. Effectively protect freedom of speech.

The fight to curb monopoly control of our economy by labor leaders deserves the active support of all loyal Americans. To the continuation of that fight we pledge our unceasing efforts.

GOLD AND MONETARY POLICY

We note with satisfaction that the Administration is committed to the restoration of the gold standard.

We reiterate our previous stand that gold and the dollar should be made freely interchangeable at a fixed ratio and that the restrictions against ownership of gold by our citizens should be removed.

The fixing of the ratio between the dollar and gold is but one of many problems of the restoration of a gold standard, but we emphasize the necessity for a ratio that can be maintained as a stable and real standard, not subject to the necessity of early change imposed by the effects of the inflationary and other disruptive economic forces which have accumulated since the departure from the gold standard in 1934.

In accordance with these views we urge:

- (1) That the restrictions on the purchase, sale and ownership of gold by American citizens be immediately removed;
- (2) That the gold standard be restored at the earliest practicable time;
- (3) That Congress fix the ratio at which the dollar and gold are to be made fully convertible and determine other technical procedures involved in the restoration of the gold standard, after receiving the recommendation of a Commission of its creation, to which men skilled in appraisal of the world's potential gold supplies as well as men of competence in domestic and international finance and trade should be appointed by designated Government authorities.

While these steps are being taken, the Treasury should cease its sales of gold to the so-called domestic industrial market, and thereby terminate the present enforced and unfair subsidy to industrial consumers at the expense of the gold miners.

SILVER POLICY

We endorse the existing Federal policy with regard to the acquisition of silver for its beneficial influence upon the base-metal mining industry, as well as for its traditional service in providing a base for a portion of the nation's currency.

GEOLOGICAL SURVEY—BUREAU OF MINES

The Geological Survey and Bureau of Mines are agencies of the Department of the Interior whose duties and responsibilities are of the highest importance to the mining industry. We commend the President and the Secretary of the Interior for their judgment and wisdom in selecting an experienced mining executive as Assistant Secretary for minerals, with general jurisdiction over these two bureaus.

We hold both the Geological Survey and the Bureau of Mines in high esteem for the excellence of their technical and scientific achievements, including the preparation and publication of professional papers.

We shall press for the transfer to the Bureau of Mines and the Geological Survey of functions affecting mineral resources which have been scattered among various other departments and agencies, thus collecting such functions in the two bureaus best qualified to administer them.

We support the newly established program of the Secretary of the Interior, under which committees composed of Department and industry experts are to study the functions and administrative procedures of the Department's agencies concerned with public lands and their resources. This

program should include inquiries into the duties and responsibilities of mineral land examiners, and should make recommendations as to the agency which should make mining claim examinations, and as to the procedure and the agency to determine the sufficiency of mineral discoveries.

The Geological Survey's topographic and geologic mapping program is of the utmost importance to the mining industry. It has a definite relation to the defense of our country and is a sound long-term investment.

We continue our opposition to the transfer of the Branch of Conservation of the Geological Survey, or any of its activities, from the Survey to the Bureau of Land Management.

MINE SAFETY LEGISLATION

We reiterate our previous position that the safety of men working in mining operations is a primary responsibility of the mine operator and a matter for regulation within the governmental structure of the States. We heartily commend the United States Bureau of Mines for its service to the mining industry in developing and disseminating improved techniques in mine safety. This work deserves adequate financial support.

MINE FINANCING

We recommend that Congress reconsider the whole question of Securities and Exchange laws, rules and regulations, to the end that the desirable objectives of the present law be maintained and that obstructive or unnecessary features be corrected by appropriate amendment or repeal.

We commend the Securities and Exchange Commission for the constructive action thus far taken in behalf of financing primary mining ventures, but further modification is necessary.

To facilitate public financing of primary mining ventures, the Securities and Exchange Commission should amend its regulation requiring that discounts or selling commissions of the securities to be offered be shown on the outside front cover of a prospectus, and should require only that such information be stated in the prospectus. It should not be mandatory for the issuer or vendor to name the States in which primary mining securities are to be offered in a letter of notification under SEC Regulation "A".

We recommend that the newly created Small Business Administration, which succeeds the Re-

construction Finance Corporation, grant loans to worthy mining companies, and that the loan activities of the Defense Minerals Exploration Administration for defense metals and minerals be continued while public and private financing are not available for mine development. We commend this agency for the fair and impartial manner in which it has thus far conducted its activities.

SOCIAL SECURITY

We approve the policy of the Administration that present tax rates payable by employers and employees for Federal social security benefits be left unchanged.

WATER AND AIR POLLUTION

Water and air pollution problems are local, not national, in their nature and scope. What may constitute a nuisance in densely populated States does not necessarily constitute a nuisance in sparsely populated areas. Functions of the United States Department of Health, Education and Welfare under the Federal Water Pollution Act should be limited to experimental studies, improvement of techniques, and dissemination of information

to industries and State and local community authorities as to practicable means of preventing water pollution. Solution of these problems, and the enactment of laws or regulations where necessary to effect such solution, can best be accomplished through cooperative efforts of industry and local authorities. This applies equally with respect to the problems of air pollution.

GOVERNMENT REORGANIZATION

We express our gratification that Congress has authorized a new reorganization commission, the Chairman of which will again be former President Herbert Hoover: and we pledge our full cooperation in assembling data for task forces or committees dealing with Government agencies concerned with public lands, minerals and the mining industry.

In the study of conservation agencies by the new Commission, we propose that it give serious consideration to transferring the Forest Service from the Department of Agriculture to the Department of Interior, where the national forests were originally organized and administered.

SPECIAL RESOLUTION ON THE ACCESSIBILITY OF CRITICAL MATERIALS

WHEREAS, The Nation must look to its own reserves for the major portion of its mineral supply, and

WHEREAS, the proper function of international trade is to supplement rather than supplant domestic production of the metals and minerals essential to our economy and the safeguarding of our national security, and

WHEREAS, the Senate of the United States has taken cognizance of this situation and accordingly adopted Senate Resolution Number 143 which reads as follows:

"RESOLVED, That the Senate Committee on Interior and Insular Affairs, or any duly authorized subcommittee thereof, is authorized and directed (1) to make a full and complete investigation and study of the accessibility of critical raw materials to the United States during a time of war; (2) to study and recommend methods of encouraging develop-

ments to assure the availability of supplies of such critical raw materials adequate for the expanding economy and the security of the United States; and (3) to report to the Senate at the earliest possible date, not later than January 31, 1954, the results of its investigation and study, together with its recommendations." And,

WHEREAS, the Minerals, Materials and Fuels Economic Subcommittee of the Senate Committee on Interior and Insular Affairs, has been authorized and instructed to carry out the mandate of Senate Resolution 143, NOW, THEREFORE, BE IT

RESOLVED that we commend the Senate of the United States for its foresightedness in this matter and offer the subcommittee the assistance of the mining industry to the end that the intent of Senate Resolution 143 may be fully carried out.



Abstracts of Convention Papers

On the following pages will be found brief abstracts of the convention papers. It was manifestly impossible to cover more than a few highlights of each of the 76 excellent addresses delivered at the Convention. Many of them will appear in fuller form in this and subsequent issues of Mining Congress Journal.

NATIONAL POLICIES AFFECT- ING MINERALS

Chairman

KENNETH C. KELLAR

Attorney

Lead. S. D.

Defense Mobilization

By **ARTHUR S. FLEMMING**

Director

Office of Defense Mobilization



IN ANY discussion of our defense mobilization program we must keep in mind certain basic assumptions. Here they are:

- (1) We are in the midst—not a year or a decade—but of an age of peril.
- (2) We must proceed from a position of strength.
- (3) We must be prepared to shift from a civilian economy to a war economy in a very short time.
- (4) We must be prepared for a devastating attack on the continental United States.

The Office of Defense Mobilization is not an operating agency. It is our job to develop policy and then to see to it that clear-cut assignments for the carrying out of policies are made to the operating Departments and Agencies of the Government. It is also our responsibility to develop a follow-up system that will insure that the operating agencies will adhere to policy.

Here are some of the problems that the Office of Defense Mobilization has been and is handling:

- (1) We have closed out salary, wage and price controls, but we are developing plans for a new system of controls if stepped-up or all-out mobilization should make them necessary.
- (2) In the materials field, the Controlled Materials Plan has been replaced by a simplified system that will insure our taking care of military, Atomic Energy Commission, and stockpile requirements.
- (3) We are following through on a program designed

to give us better information on the gaps that must be filled in if we are to be ready for all-out mobilization.

(4) We are in the process of reviewing our expansion goals.

(5) We are reviewing the basic assumptions underlying our stockpile objectives and in the light of our conclusions a careful reappraisal will be made of the objective for each material.

If there is a reasonable doubt as to whether a stockpile objective should be set at a higher figure or a lower figure, the doubt should always be resolved in favor of the higher figure.

Also, stockpile purchase programs will be carried out even though it may be necessary for the civilian economy to tighten its belt during a given period of time.

We must make it clear that where the evidence is conclusive to the effect that a stockpile objective is adequate and where we have purchased all that is called for by that objective, then the Government will no longer have any justification for using stockpile funds for additional purchases.

We are developing and putting into effect policies that are designed to insure the maintenance of a broad mobilization base. We are reappraising our manpower resources in order to determine what policy changes should take place in order to insure adequate personnel for the armed forces and adequate numbers of scientific, engineering, technical and skilled personnel for defense and defense supporting activities.

This administration is committed to and will carry forward a dynamic mobilization program. As long as Dwight Eisenhower is President of the United States, no consideration will ever be placed ahead of the consideration of national security.

National Mineral Policy

By **FELIX EDGAR WORMSER**

Asst. Secy. for Mineral Resources

Department of the Interior



NO one place within the Federal Government gives primary or exclusive consideration to the formulation of minerals policy. Many interagency committees deal with segments of the subject but there is no forum where attention is devoted exclusively to the total over-all mineral resource problem.

This is unfortunate because we need as never before a

clear national policy on minerals. Two World Wars, events in Korea, and the continued threat of further communistic aggression have brought home to us the realization that guns and plowshares do not grow on trees. We have had to scrape pretty hard for the minerals and metals that have fed our gigantic industrial economy.

No magic formula is known to prescribe courses of action within our extremely complex economic environment. There are, however, certain fundamental premises upon which we may erect a sound policy structure. I should like to suggest a few of these:

First, a national minerals policy must contribute to a strong and vigorous domestic mining industry by intensifying exploration, discovery and full utilization of our mineral resources.

Second, it must serve to promote the national interest and must be consistent with an enlightened foreign economic policy, at the same time taking into account the legitimate needs of domestic producers.

Third, it must look toward greater freedom of the market place, less intervention, support, or control by

Government. Our national minerals policy must strengthen our free enterprise system.

Insofar as it lies in my power to do so, I intend to follow the fundamental philosophy of freedom for the mining industries. We have been literally swamped in recent years with Government regulation of our affairs.

For the last twenty years, we and other nations of the world have traveled along the road of more and more Government participation in our lives and businesses. Perhaps this is inevitable, but what kind of a world shall we have if we reach the point where we turn always to the Government for a solution of our problems?

The expansion of industrial production in the United States requires a far larger supply of metals and minerals than is being produced in this country. The only policy the United States can follow is to encourage production of metals and minerals both at home and abroad.

We must do our utmost to discover and develop the full potential of our own resources, but we must nevertheless continue to look to foreign sources of supply for many raw materials.

PUBLIC LANDS PANEL

Chairman

HON. HENRY C. DWORSHAK

U. S. Senator from Idaho

HON. HENRY C. DWORSHAK

U. S. Senator from Idaho



THIS panel, charged with the responsibility of discussing the various aspects of the use of our public lands, has a tremendous responsibility. I am confident that there will be developed here interesting views showing the relationship of mining to the over-all use of our public domain.

During the first session of the 83rd Congress, several bills were introduced to revise the present mining laws. Proposals have been made which have been vigorously supported to extend a Government controlled leasing system to all minerals. Americans, who believe in the free enterprise system, confidently expect that the Federal Government and its Interior Department, under Secretary McKay, and the Bureau of Land Management, under Edward Woodzley, will oppose such proposals and support our time-honored system of private development of our mineral resources through the incentives provided by our mining laws.

We are all aware that abuses of the mining laws have occurred and are occurring today. I know that the mining industry is sincerely interested in elimination of these abuses.

Last year at the Denver meeting of the American Mining Congress, I participated in a panel which discussed

the Paley Report. I do *not* share the Paley Commission proposal that we lock up our undeveloped mineral deposits contained in millions of acres of public domain. I *do* believe that we must encourage exploration and development of our resources. This is vitally important because minerals are necessary for a properly integrated national defense.

There have been conflicting viewpoints concerning the proper use of our public lands. It is the responsibility of Congress to consider and approve legislation which will insure fair and effective administration of these lands. This panel will discuss informally various legislative proposals and some definite conclusions will result from the interesting debate this afternoon.

We want to bring out all divergent and conflicting views so that you leaders whether you represent the livestock, the lumbering or the mining industry, will have a more comprehensive understanding of the various problems involved in the full utilization of our mining laws as they affect public resources and also that you will know more about some of the proposals presented in the recent session of Congress and which undoubtedly will come before the session which will convene in January.

HON. GEO. W. MALONE

U. S. Senator from Nevada



FOR a century, Congress had a policy of holding the public lands in trust for the States until they could arrange for a better law under which these lands could be transferred to individuals. The following Acts are often mentioned: the Homestead Act, the Preemption Act of 1841, the Homestead Act in the '60s, the Mining Law of 1872 and such. Under the Homestead Act for a \$16 title fee, you could have 160 acres of land after the Civil War. When the settlers got out to western Kansas, 160 acres wasn't quite enough, so they had an extension of the Homestead Act, adding another 160 acres.

For 100 years they tried to have it so that an individual could take up a piece of land; make a living on it and own it.

The Leasing Act has been coming up every year for 20 years. This Administration, I am sure, is against changing the Mining Act into a Leasing Act. We have stopped every Leasing Act that came in to the Interior and Insular Affairs Committee. I think we can continue to do it.

Articles in the popular press lead one to believe that a man can go out to Colorado or Nevada; put up a tomato or a tobacco can with a little note in it and take up 20 acres of timber and own it. These are lies. You can't do it if the Department of Interior is doing its job unless you have a discovery. So it behooves us to have a little closer inspection from the Department of Interior and we can get it now with this Administration.

Get right out in your own communities and get support and get behind these Senators and Congressmen and tell them you are through fooling. That is exactly what you have to do in my honest opinion.

RAYMOND B. HOLBROOK

Attorney

U. S. Smelting Refining & Mining Co.



IN 1790 Congress adopted a plan for financing the Government through the sale of public lands. Under this plan, copper lands of the Great Lakes region were sold at auction to the highest bidder.

With the discovery of lead in Missouri in 1807, a leasing system was substituted for outright sale in that limited area but the cost of collection exceeded the amounts collected, and in 1829, the Government resumed its policy of outright sale to the highest bidder.

To encourage settlement, in 1841 Congress passed the General Pre-emption Act. On January 24, 1848, James Marshal found grains of gold on the sluiceway of a lumber mill John Sutter was building on the American River near Placerville, Calif. Sutter applied for a patent to the land under the Pre-emption Act, but his petition was denied because he was not an agricultural settler. His status was that of a trespasser as was the status of 200,000 other miners who came to California during that period.

Congress took no action for eighteen years. In this interval, to preserve peace and order, the miners organized local mining district governments and adopted ordinances defining a mining claim and recognizing priority of possession.

In 1858 the United States brought suit to eject certain miners in California. Judgment was for the United States and President Lincoln signed a writ closing the mines involved and ordering the militia to remove the miners. In 1864 Western Congressmen united in support of a bill recognizing miners' rights. Their efforts resulted in the Act of 1866, which recognized local customs and established a procedure by which a locator could get title from the United States to a vein or lode at a small cost. The law superimposed over local regulations two fundamental requirements for the acquisition of a mining claim: First, that a valid discovery of minerals must be made; and second, that to maintain the claim, annual development work must be performed. These provisions were intended to prevent acquisition of land in bad faith and to stimulate development of mineral lands.

In 1870 the provisions of the lode mining act were extended to placer claims and in 1872 the two acts were com-

bined with few modifications into the present mining laws.

Mining locations have been made to acquire timber, for home and business sites, and in some cases just for nuisance value. This situation has been highlighted by many sensational, ill-informed articles and has, as may be expected, resulted in the introduction in Congress of several bills to change the mining laws. Of particular interest to us are the following:

H. R. 334 by Congressman Regan of Texas, would remove sand, common stone, gravel and cinders from acquisition under the mining laws and provide for their disposal under the Materials Act.

H. R. 4983 by Congressman D'Ewart of Montana, which I believe he will discuss.

Another and drastic bill, H. R. 5358, by Congressman Hope of Kansas, applied to locations in National Forests. It would limit surface rights, subject placer mining to rules and regulations established by the Secretary of Agriculture, require application for patent within limited times, and permit invalidation of a claim because the deposits discovered are insufficient to justify development as a mining property.

Many believe that now, while we are enjoying more understanding and sympathetic government leadership is the time for the mining industry to agree to clarifying and strengthening amendments to the mining laws which will minimize the incentive to make mining locations for purposes other than prospecting, mining, or processing operations without destroying the fundamental benefits of the location system and retarding the continued growth of our mining industry.

Incentives in the Mining Laws

By ROGER H. McCONNEL

Chief Geologist

Bunker Hill & Sullivan Mining & Concentrating Co.



HAS the procedure in discovering, exploring, developing, and carrying on mining operations so changed since our mining laws were enacted that it is no longer necessary to give the miner and prospector the encouragement and security afforded by those laws?

The laws were made primarily to establish and protect a miner's property rights. The right to enjoy the fruit of his labor is no less a spur to human endeavor now than it was then.

Forest Service spokesmen assert that the miner does not need the surface, but only the minerals underground. And, they advocate that the surface be taken from the miner. The practical effect of such measures as the Hope bill would mean complete control over the mineral resources in the forests by a bureau concerned mainly with timber, range, and recreation management, and publicly antagonistic to prospecting and mining. Forest Service spokesmen also assert that ore discovery is fundamentally different from what it was in 1872.

It is, indeed, different! But, only in that it is much more difficult. Fundamentally, the search is still for surface mineral showings. These showings are almost entirely brought to the attention of operating companies by prospectors, small miners, and small companies financially unable to risk the expense necessary to test these showings.

Modern geology and modern geophysics aid in determining whether these mineral showings should be further

tested. They are no magic wand. Each is only a tool of limited reliability. Each is most commonly used in an area first brought to a mining company's attention by a prospector or small miner. So, without the prospector and small miner, many, many of these showings would never be found and tested.

The more men looking for metals, the more likelihood there is of finding them. This is well borne out by the large number of uranium discoveries made since the prospector joined the Atomic Energy Commission in the search for uranium.

The promise of ownership provided by our present mining laws is a powerful incentive for risking the speculative, arduous, and very expensive task of searching for ore. Today, this incentive is more essential than ever before.

This is no time to consider placing control of mineral exploration at the tender mercies of a bureau primarily interested in timber and recreation management. But, it may well be time to marvel that the Forest Service and the Department of Agriculture consider themselves qualified to control prospecting and mining in the National Forests, as they would if the Hope bill were enacted.

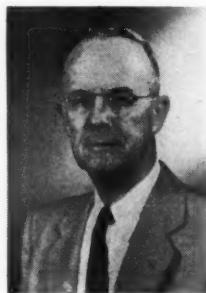
It is time to be dumbfounded that the Forest Service has deliberately encouraged abundant propaganda, seeking public support for such legislation. It may well be time to wonder why long available and heretofore effective administrative action has not been taken by the Forest Service to correct the abuses it so blatantly advertises.

On the other hand, the mining industry does not condone false use of the laws under which it operates. And so now, indeed, it is also the time seriously to consider and support reasonable and moderate changes in the law that will correct such abuses as exist.

Abuses can be corrected by administrative action and careful legislation. But, incentives must not be destroyed in the process.

CHARLES L. GILMORE

Attorney-at-Law



I WANT to remind you that the Forest Service and Department of Agriculture is the driving force behind these claimed abuses. They want a drastic revision of the mining laws. I have extensive information here to show you that is a fact. It has not requested the Bureau of Land Management, except in comparatively rare instances, to proceed against so-called fraudulent locators.

Senator McCarran of Nevada requested each regional Forest Service to advise him of the number of trespass cases initiated in each region during the past five years. All the replies that were received were so sketchy and unsatisfactory that Senator McCarran requested the Bureau of Land Management to furnish him statistics on the number of mining location contests initiated by that agency and also to report the number of contests referred by the Forest Service for action to the Bureau of Land Management. He also requested the Forest Service to furnish statistics on mining location contests initiated in the National Forests and the report on these contests referred to the Forest Service by the Bureau of Land Management.

Of all mining locators that exist in the National Forest as reported by the Federal Report Service—this means

official reports about which I am talking—from the beginning of 1942 through and including approximately August 15, 1953, totaled 910. That's the "thousands"! There are 296 favorable reports by the Forest Service and 614 unfavorable.

During that 10½-year period, the total acreage that was cancelled both by default action, by the Department of the Interior and the results of contests that they initiated and held hearings on was 25,462 acres. During that period, if all of those mining locations—if all of those mining applications were patented, were in the single state of California alone, the area involved would be ½th of one percent of the entire forest area of that State.

In recent files of the Forest Service in California, the total area cancelled as being fraudulent, as being unsupported by proper location; that is, no sufficient discovery—and that is one of the five states if you read *Colliers*, the horrible example—they cancelled 2292 acres of the total area of those forests in California. Now that is 1/1,000th of one percent of the total area. Right here in this area where we stand today, which is Region VI, comprised of the states of Washington and Oregon, the total they cancelled was 253 acres in the 10½-year period.

By HON. WESLEY A. D'EWARD

U. S. Representative from Montana



IN THE next few minutes let me summarize what I think are the basic problems involved in considering public land laws, whether they deal with mining, grazing, or some other use, and regardless of which agency it is that administers those public lands. Those problems are:

(1) How can we provide for our national need to conserve and use the nation's natural resources?

(2) How can we provide for development of our natural resources so that the nation can remain economically sound and strong?

(3) What method can we choose for achieving both conservation and development without unnecessary cost to taxpayers, without unnecessary handicaps to the private development, and with effective use of manpower in development rather than in supervising?

The need for "development" should be given primary attention. There can be no future for this nation without conservation of natural resources, but there can be no future unless we maintain the financial integrity of our government. Neither can we be economically sound if our natural-resource development is unnecessarily handicapped. The very security of our nation depends upon an active operating and healthy mining industry. You cannot stockpile a healthy mining industry. Development must be encouraged if we are to keep the mining industry healthy. Access to the public lands is only one part of that problem, but it is the part I want to develop today.

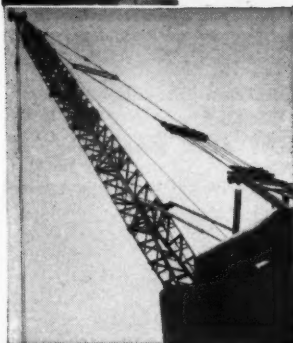
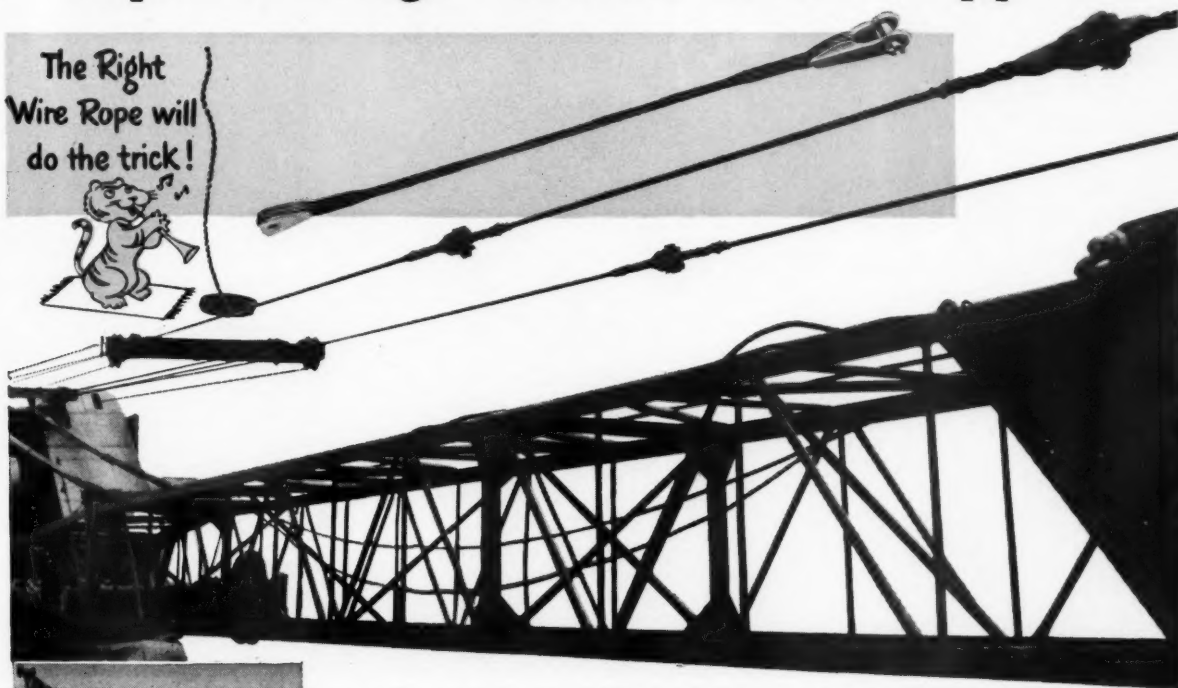
Now, let us look generally at the mining law revision proposals. The basic argument advanced has been that protection of our watersheds is in jeopardy. Demands are made for changes in the very philosophy of freedom for American initiative, of access to resources, and of security of investment. I cannot agree that the need for such changes has been established.

Let us recognize that the mining laws have been improperly used for non-mining purposes in many cases—to obtain cabin sites, home sites, timber, water rights, or for

(Continued on page 65)

Crane rental company increases safety with these Improved Tiger Brand Boom Supports

The Right Wire Rope will do the trick!



The new Tiger Brand Boom Supports on this 25-ton Cranemobile can be inspected visually, because there are no sockets to hide part of the rope. What's more, interwoven ends distribute vibration over a longer part of the rope—keep these improved boom supports in safe operating condition 2 to 3 times longer.

Last year, Lee Crane Service, Inc., Boston, Mass., added an extra measure of safety to every one of its 14 truck cranes. It removed apparently sound—but potentially dangerous—boom supports equipped with ordinary zinc sockets and installed new Tiger Brand Boom Supports.

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Here are the reasons for this change, as told by Mr. Joseph Veanor, owner of Lee Crane Service: "Easy visual inspection is the reason we switched to Tiger Brand Pendants. With the old zinc-socket type, we could never be positive that a pendant was completely safe because the sockets hid part of the rope.

"These Tiger Brand Pendants completely eliminate the use of sockets. As a result, we can see and inspect every part of the rope. If any wires are broken, we can replace the pendant before a failure occurs.

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Last 2 to 3 times longer

Tiger Brand Boom Supports last longer than the old-fashioned socket type, because each end of the wire rope is tightly and permanently interwoven. This spreads strain and vibration over a much longer section of the rope, instead of concentrating all the strain right at the socket. As a result they last 2 to 3 times longer than other types.

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FROM THE FRONT



FROM THE REAR

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No matter how you  look at it, or what comparisons



you make—here's the truly **SUPER** loader for medium-low coal



If you'll keep in mind that the Joy 14-BU has long been the world's most widely used loader . . . and that more coal is loaded by 14-BU's in medium-vein mining than by all other loaders combined—then you'll have a clearer picture of the improvements that Joy engineers have built into this year's **SUPER** 14-BU Loader.

Starting with the simplicity of design and unmatched durability that made the 14-BU so popular, the **SUPER** 14-BU is bigger, faster and more powerful than ever. Here are some of its principal advantages:

1. **Horsepower**—increased from 40 to 65 HP.
2. **Peak Loading Capacity**—20% greater.
3. **High Tramming Speed**—increased from 88 to 125 FPM.
4. **Mechanical and Electrical Components**—all increased in size and strength to match the increased motor HP.
5. **Machine Weight**—about 900 lbs. more.

6. **Heights**—unchanged at 30½", 33" and 36", just what the doctor ordered for mining in seams from, say, 36" to 60" thick.

7. **Conveyor Chain Speed**—increased about 30% to more than 300 FPM. Stronger Conveyor Chain, too—with 45% greater tensile strength.

8. **Maintenance Costs**—reduced by providing over-size horsepower motor, wiring and electrical contactors, etc.

Add extra advantages like those to Joy's famous gathering mechanism and exclusive Magnetax control—features that have been field-proved in every coal mining area in the world—and you have the kind of easy-operating, heavy duty, high production loader that means increased tonnage and reduced costs for you.

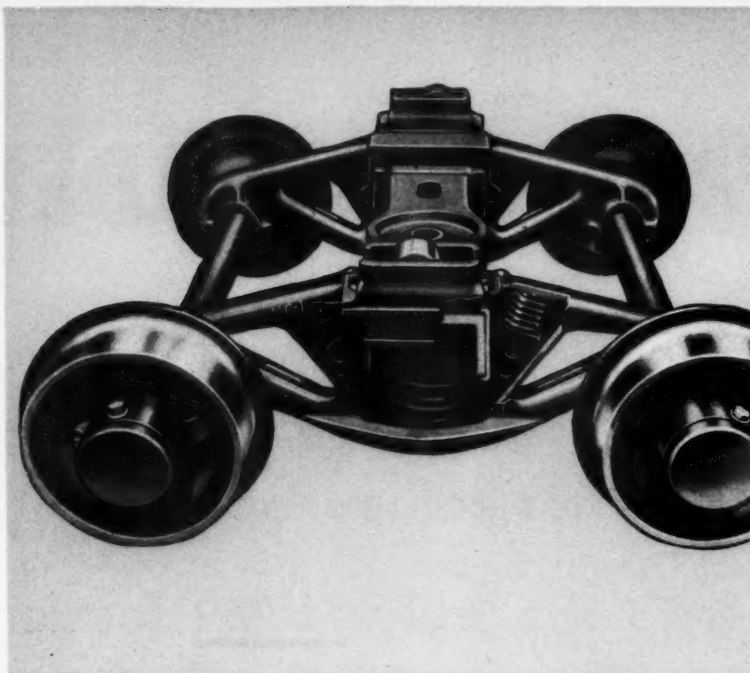
● Let us show you what **SUPER** 14-BU Loaders or other Joy Mechanized Equipment can do to improve your profit margin! **Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.** In Canada: **Joy Manufacturing Company (Canada) Limited, Galt, Ontario.**

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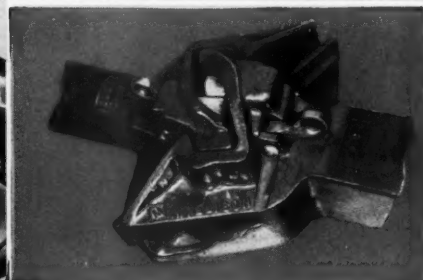


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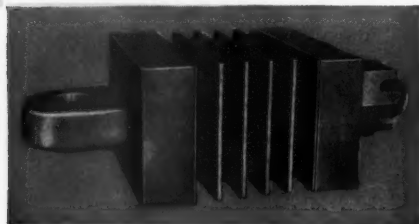
The NC-1 Truck climaxes 20 years of intensive research, providing (through the friction control mechanism shown in cut-away) protection to equipment, roadbed and lading with maximum wear life.



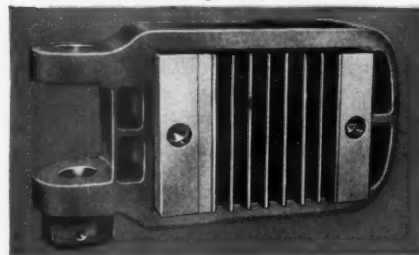
Willison Automatic Couplers save time with maximum safety . . . can be coupled at either end of car or locomotive . . . require no manual assistance. Close coupling eliminates damaging slack, permits high speeds with maximum stability.

NATIONAL *products cut per ton costs!*

Latest example of National's pioneering in better equipment is the NC-1 Truck. Its sweeping advancements over conventional trucks include long soft springs, a friction mechanism—controlling vertical and transverse oscillations, a cast one-piece bolster with large lubricated center connection, and automatic frame alignment. The NC-1 has been designed with the same factor of safety that is required by the Association of American Railroads for full size railroad trucks, and embodies the same features which A.A.R. tests have shown to be essential to produce good riding qualities. For the best in profitable equipment, *always specify National products.*



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Willison Automatic Couplers • Friction & Rubber Draft Gears • Car Trucks • NACO Steel Wheels • NACO Steel Links & Swivel Hitchings



Est. 1868

(Continued from page 60)

other purposes. Because there are speeding offenders, we don't rewrite the laws to prohibit private operation of cars because a robber breaks into your home, we do not try to prohibit your owning a home. We try enforcing existing laws!

For adequate protection of our natural resources and at the same time avoid any unnecessary handicaps to the mining industry and to certain other uses of the public lands, we must move with care and with full knowledge. We need facts.

This is the course I propose:

- (1) Determine whether the present mining laws are being adequately enforced.
- (2) If they are not, determine if they can be.
- (3) If they are enforced, will the so-called abuses of the mining laws be eliminated or substantially reduced?
- (4) Test any new legislation that is proposed by these questions.
 - (a) Will it provide inducements to mining development?
 - (b) Will it allow the protection of our natural resources from waste?
 - (c) Will it eliminate all unnecessary obstruction to developing minerals in public lands?
 - (d) Will it give a priority to development of public lands by private effort when no public interest is damaged?
 - (e) Will it prevent Government agencies from imposing restrictions that are more for administrative convenience than for public benefit?

I believe that abuses in relation to existing claims can largely be eliminated by enforcement of existing laws. To prevent abuses in relation to future claims, I submit that the following steps are the answer, without hindering mineral development:

- (a) Enactment of the Regan Bill.
- (b) Enactment of legislation which will make it easier for our citizens to obtain home sites in national forests.
- (c) Enactment of H. R. 4983.

HON. JOHN P. SAYLOR

Member of Congress from
Pennsylvania



WHAT I have to say to you today, I say to you as a friend of the mining industry. If you are going to be the veritable ostrich and put your heads in the sand and say, "There is nothing wrong with us"; boys, you are in more trouble than you have any idea.

You have let your enemies "steal the ball." Now the good lawyer over here could tell you there is only a fraction of one percent that were fraudulent mining claims and he may have facts to prove it. But that is all that cancer is when it starts.

Now, I don't know just what changes should be made and I am not going to try here to tell you. But unless the American Mining Congress will give to the House of Representatives and the United States Senate the best thinking of your industry for what is best for your industry and the United States, you are going to be in more trouble than you are today.

The Hope bill is an idea of what you can expect. They would like to make a different rule in the National Forests on mining than would be the case on public lands. Now

mining is mining whether it is on the National Forest or whether it is on the public land. There should be one set of rules. You should play the game according to the same set of rules wherever you mine.

Your industry, if it is going to remain strong, going to remain a powerful force to keep this country strong, has got to get busy and get its story across to the public. Agree today, that today we are going to make a new set of rules—maybe they will all be basically the same as they are right now—but there are going to have to be some changes made. When they do, if your best thinking, your best men are given to the Representatives in Congress, I am sure that the mining industry of this country will continue to be a great force, not only to maintain our economy but to maintain our defense.

Mining Law Enforcement

By LEWIS EDWIN HOFFMAN

Chief, Division of Minerals, Bureau
of Land Management
Department of the Interior



BEFORE telling you what Bureau of Land Management can do to enforce the mining laws and avoid or minimize the abuses thereof, it is necessary to point out briefly, our jurisdiction.

The Bureau of Land Management has jurisdiction over mining claims on the public domain lands.

Since June 17, 1910, under joint regulations of the Department of the Interior and the Department of Agriculture, which were modified and repromulgated on September 4, 1915 (44 LD 360, CFR 205), the responsibility for investigating mining claims in the national forests was given to the Forest Service. When that agency protests a mining claim or application for mining patent, the Bureau of Land Management will hold a hearing to determine the validity of the claim.

From January 1, 1949 through December 5, 1952, the Bureau of Land Management declared 6456 mining claims invalid. Of this number, only 197 were reported to us on protests by the Forest Service for adverse proceedings.

Within the scope of our jurisdiction and limits of our personnel; and within the intention and spirit of the mining laws and regulations, we move to eliminate unlawful occupancies of the public domain lands made under the guise of mining claims.

To expedite and simplify the procedure for declaring fraudulent mining claims null and void, we have before us a plan to establish the position of a Hearings Examiner, duly certified by the Civil Service Commission. This will be more in the nature of a judicial proceeding, with the right of the Examiner to rule on evidence and render a quick decision on the record. He will thus directly represent the Director in the field. The evidence will be considered impartially and fairly by a party who in no way had anything to do with the examination of the mining claim, who is not subordinated to any local office or region, but who has complete freedom and independence of decision. The right of the mineral claimant to appeal from such decision will be preserved.

To bring to the attention of persons who desire to take up public domain lands for such non-mining purposes as homesites, recreational uses, and business purposes, we have distributed thousands of letters and easy to read literature, advising them of the Small Trade Act and that they should not locate mining claims therefor. This educational campaign has been well received by the general

public who had previously been misled by recent articles in several magazines.

We believe that in this way the improper use of government lands for non-mining purposes by the location of fraudulent claims, will be substantially reduced.

As concrete evidence of our interest in preserving the "property rights" of legitimate mining claims, I cite the position of our Department and the Bureau of Land Management as set forth in our favorable report on the D'Ewart Bill, H. R. 4983, and in opposition to the Hope Bill, H. R. 5358.

A Cattleman's Views

By RADFORD S. HALL

*Assistant Executive Secretary
American National Cattlemen's Assn.*

AS AN organization, the American National Cattlemen's Assn. does greatly appreciate this opportunity to be with you and take part in this great national convention of mining men. We also appreciate the friendly ear and earnest consideration which your leaders and staff have given to problems that the livestock industry faces because of abuses of the mining laws.

It is our sincere belief that all private industry users of the Federal lands must work closely together, each giving mutual consideration to the others needs and prob-

lems. Above all, we must not fall prey to the old but effective trap of "Divide and Conquer" which some groups have been attempting to set for us.

We must stop the growth of bureaucracy and the acquisition of lands by the Government if we are to preserve private enterprise. However, the cooperation must include a willingness to examine critically our own past privileges and procedures and a willingness to concede where concession is necessary. If we don't settle our own differences someone else will do it for us and we will all lose.

An example of the type of cooperation needed may be seen in the broad-minded support of your officers of H. R. 4983, introduced by Congressman Wesley D'Ewart and the endorsement of the American National Cattlemen's Assn.

In my opinion the basic problem faced by all private industry users of the National Forest is that the Forest Service is confusing its purposes with those of the National Parks and many of its staff are imbued with the belief that recreation and preservation of scenery should be their principal objective in managing these vast areas.

The Director of Markets of New York City told me a few years ago that very few of the people in that city care about the number of deer in the National Forests of the West but every one of the millions of people were vitally interested in the amount, quality and price of the beef, lamb and wool that came from them.

In conclusion, I would like to say that the cooperation between our industries to this time has been gratifying and helpful—all we need is more of it. The cattlemen will meet you at least halfway.

Museums Are Dead Wealth

By J. M. JONES

*Executive Secretary
National Wool Growers Assn.*

FIRST of all, I believe in the development of our western resources. All sheepmen do; so do the miners, and that means we have enough common interest in the problem.

Secondly, we believe in letting people do things for themselves, and so do the miners. That's another common interest.

And, third, we believe that a man who has a financial interest in the conservation of natural resources is a better practicing conservationist than one whose livelihood is not dependent upon it.

Our national industry organizations, like the American Mining Congress and the National Wool Growers are far more entitled to be called conservation groups than any of the alleged conservation clubs made up of people with no direct financial interest in the creation of new wealth in this country.

The mining law of 1872 was passed when there wasn't much development in this part of the country. Consequently, any development of mining that could be brought about was to be encouraged as an aid to the economic development of this Western country. The situation has not changed much even today. However, there have been certain public interests that required withdrawal of public lands. We all recognize, and agree with them, if used with moderation instead of excess. The withdrawals I mean include those of scenic resources for the national parks, or certain critical watersheds that constitute a small part of our national forests. Also, there has to be conflict for places in which to live and for places to carry on recreation.

Fundamentally, actual mining still took precedence. There is nothing in any of the laws on the books that denies that precedence today, except when the lands are properly or otherwise closed to mining location. Nor, do I think there is anything that allows someone to use the mining laws for another purpose. If only the laws were enforced like the homestead laws began to be enforced

after 1934 when the conflicts of use became apparent.

As a shepherd I am exceedingly glad to be here today. This is the most important national association that has even seen fit to bring together on one panel the various diversified groups with a common interest in the public lands. I want to commend the American Mining Congress for taking the initiative.

We certainly do not want the public lands exposed to a policy of limited "museum management." Secondly, we think that we can be very critical of certain methods of administration of Federal lands and still be sound conservationists. The Forest Service in the past, and I hope it doesn't continue in the future, has confused its methods of operation with the national goal of conservation.

Between the Mining Congress, the National Livestock Associations and other people, I believe we struck a very definite blow for conservation by teamwork, instead of conservation by Government dictation.

Last December when we were holding our National Convention in Chicago some source presented to our resolutions committee a number of resolutions dealing with mining claims. The gist of them was that we should condemn the archaic mining laws because they were so old they could not be good. We might have fallen into the trap if we hadn't recognized the technique. I think you will be interested in the resolution that did come out of our National Convention last December. It said this regarding revision of mining claims: "We recommend that the officers of the National Wool Growers Association confer with the American Mining Congress looking toward a joint effort in regard to the regulation of mining claims."

That is our attitude about the way the mining group and the livestock group ought to work together, and we think every other industrial group that uses the public lands ought to participate, too. We think the natural resources should be available for development, and we prefer to have private business rather than tax dollars do the job of improving and developing the natural resources. We think Government should remove rather than raise obstructions, and so we advocate continuing programs that help the nation rather than the bureaucrats. Natural resources should be used without waste. Museums are dead wealth. More power to you, and I hope that we can work together more actively in the future.

ERNEST L. KOLBE

Forester
Western Pine Association



THE most critical problem in our Western forests is protection—not against the miners—but against tree killing insects, disease and fire. Conflicts between lumbering and mining do not rate a high priority.

Lumbermen are, in fact, very much bewildered by the increasing newspaper and magazine attack on the mining laws and how they give away public land and timber for free.

We in the lumber industry didn't learn of the mining problem as a major issue until about two years ago. At that time it came up for discussion at a Western Pine Association meeting. Road right-of-way problems and timber sale restrictions on unpatented claims were mentioned by our group of over 100 lumbermen but surprisingly few cases were from personal experiences and of recent date. Several timber operators pointed out that they not only were free of conflicts with miners, but actually had their help and cooperation on roads and other projects.

At any rate we made an investigation of the conflicts our industry had with miners in our 12-state Western Pine Region. Of the 400 questionnaires sent out, eight lumber companies reported road right-of-way and other problems. Seven company managers wrote that they had heard of mining problems.

To confirm our findings that there was no great conflict in the use of public lands between miners and lumbermen our group asked for further study in each state by local

lumbermen committees. These state groups haven't reported for the most part.

Two of these committees on the state level have had meetings with their local mining groups. They say that miners are eager to work with lumbermen and are willing to help work out solutions to conflicts. In one state the miners suggested a joint committee to investigate problems as they develop and to work out solutions at the local level.

One state group gave the opinion that government agencies have grossly magnified the problem, also that the present publicity on the mining problem has actually encouraged chiselers. They felt that the situation regarding fraudulent claims may now really become acute.

Nation-wide, we found that mining on public lands was not recognized as a problem of any magnitude until rather recently. There is no mention of mining on public lands even in the American Forestry Program of 1947. However, it will be in their 1954 program and it is to be discussed at the American Forestry Congress this October. The proposed program for the Forestry Congress includes the following statement:

"Efficient management of many millions of acres of federal public lands, including the discovery and development of new and known mineral resources, is in the public interest. The legitimate miner and prospector should be encouraged to carry on such work. However, widespread abuses under the existing mining laws—namely efforts by individuals to use the mining laws as a means of acquiring government lands for other than mining purposes—should be stopped. We, therefore, recommend that:

"1. Congress revise the federal mining laws to prevent their abuse by claimants or patentees who use their claims to tie up more valuable timber or other surface resources than the legitimate need to develop the minerals."

I trust miners will attend the Forest Congress to explain some of their problems and defend if need be the interests of the legitimate prospector or producer of minerals.

We hope that any change in the mining laws will end abuses and give necessary incentive to the miner in supplying our country with much needed minerals.

HON. CLAIR ENGLE

Member of Congress from
California



AT this stage of the proceedings, we are apt to be, I think, a little repetitious and so I would like to take just a few minutes to try to pull this discussion together. There are two basic philosophies in connection with this problem. "One philosophy is to out-fight it; the other philosophy is to out-legislate it."

So finally, an organization with the responsibility, the American Mining Congress has for the American mining industry, has to take a position. Sooner or later, we have to stop talking and start acting. When we start to act, we have to act upon certain basic assumptions and from those, we have to determine the proper tactics to take for the industry to get the best possible legislative results. That involves fact finding. Just what are the facts? Do the mining laws need some changing or don't they need some changing? As to our tactics in the Congress of the United States, can we out-fight them or must we out-legislate them? What is it? All of us here are interested in the mining industry or we wouldn't be here. Those of us

who are legislators want direction from the industry itself.

Now, what are the facts? In my opinion the facts are that the mining laws need some changes. Fraudulent claims are filed occasionally. We want to see the defects, permitting those kind of things, stopped.

Now, we have to do something about it. Once we determine that, it is a question of tactics. My personal analysis of tactics is simply this: Let's get the initiative. The way to do that is to have a program. What kind of a program do I suggest? I suggest as No. 1 that our Chairman, Senator D'Ewart, call a hearing shortly after the first of January and ask the Forest Service and the Bureau of Land Management and these publications to step in before his Public Lands Committee and give us some testimony on what they are doing to enforce these mining laws in the National Forest and on the public domain, and explain why they didn't do a better job. That is No. 1. If they need some legislative help, let's give it to them.

No. 2—let us come forward with a broader mining program. Let us come forth with a D'Ewart bill and a Regan bill with modifications, if needed, to take care of the abuses. Get them out of the way; take those weapons out of the hands of our critics.

No. 3—get an affirmative program like a program for geophysical mining exploration. I had one several years ago; we couldn't get anywhere with it.

No. 4—step forward with a definite mining program for the American mining industry.

Most of all and always, let's go before the American people, not only with a program that is appealing to us, but one we can sell to the fair-minded people throughout the United States who have no special interest in mining but who want to do what is best for all the country.

HON. HARRIS ELLSWORTH

Member of Congress from Oregon



I AM going to tie up the subject very quickly now. First, what is the law about? You have heard about that. It is because there have been fraudulent mining claims filed, most of them in the National Forests. Why have they been filed? They have been filed because within the last few years, it has seemed to be possible to make a little money out of the nuisance value of mining claims, particularly in areas where there is timber.

ADVANCES IN MECHANIZATION

Chairman

S. S. CLARKE

Superintendent of Mines

Tri-State Mines, Eagle-Picher Co.

Developments in Equipment, Methods And Controls for Increased Production At Climax

By JOHN PETTY

Mine Superintendent
Climax Molybdenum Co.



CLIMAX is in northeastern Lake County, Colo., on Fremont Pass at an elevation of 11,320 ft. The caving system under which Climax operates its mine today is the result of many years of evolution. After attempts at mining by open stope methods and later by an adaptation of an alternate cave and pillar system, a caving system has been developed which lends itself to the rock and structure of the orebody and to production requirements.

The slusher system for ore production has been worked to its present stage of operating efficiency in 17 years. For our orebody and our requirements, the slusher system has proved to be safer and more efficient than the chute and grizzly system; allowing much better control, better ventilation, and providing consistently higher rates of production.

The Storke Level started operation this year caving a 300-ft lift below the Phillipson Level. Storke Level ore is hauled out a single-track adit similar to the Phillipson Level to one of the largest gyratory crushers in the world. The new level was developed with the knowledge gained from extensive experimental work on the older level.

The two most important improvements in haulage are introduction of trolley-radios and the addition of im-

proved electric locomotives. Both inside dispatchers have radios which enable them to be in contact with all the motor crews and all the motors have contact with each other.

It started about ten years ago. Now, how are we going to stop it? That is what we have been talking about. There is plenty of law on the books already to accomplish the purpose of stopping these illegitimate mining claims. Over the last three years, I have had considerable correspondence with the departments of Government asking them to tell me specifically why these phony mining claims couldn't be stopped. They haven't any answer to that except the conventional one, "you don't give us quite enough money." Supposing then, that it is a costly and cumbersome thing to fight these abuses under existing laws; then probably we should have some further law on the subject. With that I am quite willing to agree.

But in order to get rid of this nuisance, we don't need to destroy valuable mining laws merely to solve abuses. It is not necessary to remove the incentive for mining exploration just to remove the incentive for filing phony mining claims. I think there is a solution to it and that is make it completely unprofitable to make a foolish and phony mining claim. Just simply make it useless for such a thing to be done.

proved electric locomotives. Both inside dispatchers have radios which enable them to be in contact with all the motor crews and all the motors have contact with each other.

Ventilation of the Phillipson Level was affected after the mining of this area was completed. Whereas, the ventilation on the Storke Level was carefully laid out and installed at the same time the slusher drifts and haulage drifts were driven.

The slusher drifts and equipment are unique at Climax. The design of the drift, hopper, fingers, sheave mountings, folding scraper, hoists and all assemblies have been engineered and perfected in the mine. One hundred fifty-hp tandem hoists, with hi-slip motors pull fully loaded six-ft dippers of ore over rail-lined slusher drift floors. The ore is loaded into the ten-ton ore cars through heavy cast manganese draw-hole frames, which are supported by heavy steel construction.

Fresh air is forced into the working areas by means of a large axivane fan pulling air from a surface raise. It is distributed into the haulage drifts through a ventilation lateral by means of overcasts. At the opposite end of the block contaminated air is exhausted to the surface through a ventilation lateral and exhaust raise. Small drifts from the exhaust ventilation lateral collect contaminated air from the slusher drifts.

In the development of slusher drifts it was found that the rock itself was not capable of standing without support. No method of support was satisfactory until concrete was used. A minimum of one ft of concrete is used leaving a finished size of 7 ft by 9½ ft.

An effective but simple stoping method is used consisting of undercutting the block on a 45 percent slope and longholing the pillars. Alloy steel and carbide bits are used for the drilling. Millisecond delays are used for timing the pillars when the stope is ready for blasting and caving.

Climax Molybdenum Co. is completing a large expansion program and a production schedule of 28,000 tpd by the end of this year is foreseen. Constant changes have forced improvements to meet ever increasing demands.

Trackless Mining at Pend Oreille

By L. M. KINNEY

General Mine Superintendent
Pend Oreille Mines & Metals Co.

Full text of this paper appears on pages 28 to 29 of this issue.



A. B. Chafetz

Recent Developments In Mining at Carlsbad

By A. B. CHAFETZ

Asst. Supt. of Maint. & Engrg.

and

E. C. SKINNER

Industrial Engineer

International Minerals & Chemical Corp.



E. C. Skinner

POSTWAR demands of the fertilizer and chemical trades have caused expansion programs in the Carlsbad Potash Basin not only to existing facilities on the surface, including new chemical plants, but have called for new and different types of equipment in mining and expansion of existing mining facilities.

Some of the improvements in technology are the introduction of continuous miners, jumbo drills, diesel electric locomotives, and diesel shuttlecars operating underground at various properties. One of the mines is making a large expenditure underground to develop their own continuous miner. Their plans call for the construction of four of their own machines as well as four continuous mining machines of one of the manufacturing companies. A new 40-ton diesel electric locomotive for main line haulage has

been put into operation in one of the mines to accommodate heavy haulage. Two 20-ton locomotives are being operated in separable tandem at several of the mines. Automatic current limiting dynamic braking is used on these motors to bring loads down six percent grades safely. Diesel bulldozers have been introduced underground for cleanup purposes and for stockpiling. They are also used for gobbing salt waste.

Primary distribution systems have been changed from 2300 v. to 4160 v. and in some cases, 12,470 v. Mine power centers have been introduced underground. These units consist of transformer and secondary breakers with plug attachments so that the secondary distribution system can be plugged into the low voltage side of the power centers. These units are portable and their use is very flexible in the mine.

Some of the mines are using belt conveyor gathering and are contemplating main line haulage belt conveyors. Hoisting systems have been changed. Most of the mines have automatic hoists. One property is installing a remotely-controlled automatic mine hoist. The hoistman on this remotely-controlled hoist will be located at the collar of the production shaft. His control console will include a graduated braking system as well as intercommunication systems between the mine and refinery. Industrial television is being considered to improve hoisting safety. A completely automatic man and material hoist is being engineered for one of the companies. This hoist will have elevator-type controls. Methods of sinking shafts have changed. Some of the newer shafts are round or oblong rather than the usual rectangle.

Current construction programs in the Basin total over \$12,000,000. Anticipated expansions call for the expenditure of many more millions of dollars. As expansions to surface plants are introduced, more equipment will be brought in underground to serve the mines.

TARIFF PANEL

Chairman

J. B. HAFFNER

General Manager

Bunker Hill & Sullivan Mining & Concentrating Co.

ANDREW FLETCHER

President

St. Joseph Lead Co.



War, it is believed that ocean transportation costs will be greatly reduced. There is no doubt that costs for foreign metal delivered in U. S. markets will be even lower in 1953 and future years.

(3) Although the actual amount of lead and zinc in the U. S. Government's permanent stockpile is not known, there now must be between 800,000-1,000,000 tons of both lead and zinc in the Government stockpile. With the production from Canada and Mexico in the event of a war, it is unreasonable to expect that there is any need for greater U. S. stockpiles. This comment is made on the assumption that there will be a lead and zinc industry in the United States—also, I am not in agreement with any proposal for international buffer stocks, international commodity agreements or cartels.

(4) It is apparent that the world production of both lead and zinc for at least the last five years has been considerably in excess of world consumption. If a balance is to be obtained, production somewhere in the world must be curtailed—should the high cost production be shut down?

(5) In connection with curtailment of production, there are two schools of thought—the so-called free traders and the group of domestic miners who wish to maintain their properties, supplemented by those who feel that for the defense of the United States, as well as for the economy of our country, the domestic mines should not be shut down.

At the present time the excess of world production is almost equal to the entire U. S. production. If you feel as I do that it is inadvisable to shut down the domestic mines, then the solution for maintaining the U. S. mining industry can be subdivided under four general headings:

(A) Subsidize U. S. Production, as is done for agricultural products, air mail, American steamships, etc. My objection to subsidies is that in the end the Government will control the mining industry, as our farmers are beginning to realize in respect to their properties.

IN considering the situation facing the lead and zinc mining industries of the United States, the following table may be of interest.

(1) Although the unneeded 1952 imports were, in the main, absorbed by the Government stockpile—this year the industry apparently will not have this source of relief.

(2) Average foreign labor rates are considerably less than domestic. Transportation costs of foreign produced metal and ore have been very high, but they do not offset the lower production costs. With the end of the Korean

LEAD						
Short Tons						
Year	U. S. Consumption	Mine Production	Secondary	Required Imports	Actual Imports	Unneeded Imports
1953 (Est.)	(a) 1,173,000	(b) 355,000	(c) 421,000	397,000	(a) 646,000	294,000
1952	1,130,795	384,097	471,294	275,404	615,619	

ZINC						
Short Tons						
Year	U. S. Consumption	Mine Production	Secondary	Required Imports	Actual Imports	Unneeded Imports
1953 (Est.)	(a) 1,171,000	(b) 570,000	(c) 50,000	451,000	(a) 768,000	317,000
1952	940,496	661,023	52,856	226,617	563,842	

Assuming that:

- (a) first six months' rate will continue, and including zinc ore required to produce American Process oxide.
- (b) no lower price, and a continuation of June output rate.
- (c) continuation of first four months' rate.

(B) Increase the present lead and zinc tariff from about eight percent of the value of the metal to a lead rate of, say, 43 percent of the metal value which prevailed during the 1935-40 Pre-World War II period, and for zinc, say 36 percent. Because of the Reciprocal Trade Agreements, an increase of around 30 percent on the metal value would be difficult, but some relief could be obtained under the Escape Clause which permits of an increase of 50 percent above the base agreed upon at the Geneva meeting. The underlying objection to a fixed rate is that it does not give protection when the domestic price falls to abnormally low levels, and tends to increase the domestic selling price when there is an abnormal demand or an artificially created market shortage. Our consumers prefer a steady price at a fair level, and the miners are in full agreement.

(C) Import Quotas—this is a device used by many foreign nations, and by the United States in respect to sugar and certain other commodities. My objection to it is that it would require more, not less, Government intervention.

(D) The industry's proposal of the sliding scale import tax or tariff. Fundamentally, this plan seems to me to be the best one for consumers, miners and our country, as there would be no tax or tariff when the domestic price indicated that there was a demand in excess of normal requirements.

Based on the foregoing, what should be decided is:

Do we or don't we want a domestic mining industry?

If we do, what is the proper method of maintaining it, giving due consideration to the best interests of consumers, producers and our foreign friends?

HON. RICHARD M. SIMPSON
Member of Congress from
Pennsylvania



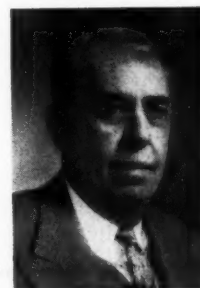
BEFORE anyone can pay taxes, before anyone can have a job, there has to be an employer and the employer has to live within the continental United States. Regardless of the magnitude of your argument, regardless of the peculiar international situation, it makes sense to believe that we cannot operate as business men operating a profitable business nor can we provide jobs for the thousands of persons who are skilled in mining and want to work in competition with an excess of imports from abroad.

Basically it behooves our country to provide jobs for American men where employers want to give them a job and above all, where the country needs and indeed must have the products. We must have, here at home, the vital metal mining industry necessary for our nation's defense, and without which we cannot count on the future of our country. Something must be done to protect it.

I am not satisfied with reports that say that the mineral is just as good for our future defense when it is deep in the ground where nobody can steal it as it is if being produced by an operating industry which is ready to help when called upon in an emergency. Even though I am far way from the metal mining industry, I do live where coal is mined and I know, a coal mine or

any mine when it consists of a hole in the ground partially filled with stone, water and dirt, is of no value in an emergency to provide whatever mineral may lie beneath. For many years, I have actively taken leadership in the House in connection with protecting American industry. Along with many of my colleagues in the House, we earnestly hope in the next session of the present Congress to succeed in giving industry the protection which is so necessary to provide for the safety of our country and to provide jobs for men eager and anxious to work in their chosen professions.

W. LUNSFORD LONG
Vice-President
Tungsten Mining Corp.



ALTHOUGH the United States is one of the world's largest consumers of tungsten, it produces only 20 percent of the free world's production. China has the largest known reserve of tungsten ore and was the largest producer before falling into the Red orbit.

Inadequate tariff protection on domestically produced strategic materials doesn't carry out the full Congressional intent enacted into law on August 7, 1953. In accord with the policy set forth therein, there should be a re-study of the whole tariff question for the strategic materials and an adequate tariff under today's costs and

conditions set up for each of them. Inadequate tariff protection on the domestically strategic materials serves only to build up such production in other parts of the world. In time of war or national emergency, it would be difficult if not impossible to keep open the supply lines to any of these countries other than Canada.

Some of the strategic materials are protected to a varying extent, none adequately, and some are on the free trade list. A consistent policy must be adopted on all strategic materials. The best method is the historical use of the protective tariff. If the tariff is to be relied upon as an instrument of policy, it must be revised to meet today's need.

If some other devices, like temporary buying programs, are to become permanent instruments of policy, then the program should be made continuing as in the case of agricultural products and set up to cover the whole of the strategic metal mining industry and not just the few now programmed in a limited way.

We must keep our strategic metal mining industry on the search for the things we need by adopting some implementation in a thoroughly practical and effective way of declaration of policy so recently made by a unanimous Congress and approved by the President.

JOSEPH H. TAYLOR

Vice-President

Peru Mining Co. and

New Mexico Consolidated Mining Co.



THE previous Administration's stated policy was to encourage the development of lead and zinc mines in friendly foreign countries. We do not wish to criticize this emergency policy; however, it is evident that this policy, together with devaluation of currencies in many foreign countries, has brought a most deplorable condition for our domestic lead and zinc mining industry. The drastic decline in the price of lead and zinc, due to dumping of foreign lead and zinc in this country, has made it impossible for hundreds of mines to continue operations.

To get down to cases, in April, 1952, New Mexico ranked fifth among the states in the production of zinc; during this month 5000 tons of recoverable zinc was mined. Now the production is but 20 percent of this amount.

The Central Mining District of New Mexico is less than 100 miles north of the Mexican border. In Mexico miners are paid about as much per day as our men earn per hour and the standard of living is correspondingly lower. I don't want to see our standard of living reduced to that level.

In normal times, two-thirds of the zinc consumed within the United States is produced by our domestic miners and one-third comes from foreign sources. It is not our wish to prohibit the importation of zinc and lead, but to control the importation and protect domestic mining.

Our mining industry has always responded loyally in support of our country's defense in war and emergencies. We are only asking for fair consideration and support to be able to operate under conditions that would enable us to pay our workers a wage scale to maintain a desirable standard of living for themselves and their families and to maintain our mines so that we can cope with the next emergency that arises.

Suggestions have been made for federal aid such as subsidies, premium prices, and price support. All such

methods requiring appropriations by the Federal Government are not conducive to economical production of metals and increase Government control in business contrary to our free enterprise system. It is not our desire to advocate high tariffs to cut off imports. The industry in this country is united in advocating a sliding scale stabilizing tax to control the importation of lead and zinc.

The recommendation that the zinc mining industry should make application to the Tariff Commission should be followed up by the industry; however, it is our belief that the escape clause cannot save the industry.

To sum up, the excessive importation of lead and zinc from countries having low-wage scales has had a disastrous effect upon the domestic mining industry. Hundreds of men in New Mexico are out of work. All lead-zinc mines in the State are closed or operating at terrible losses. A stabilizing, sliding scale import tax, such as H. R. 4294 provides, is needed promptly to save the lead-zinc mining industry.

G. C. MONTURE

*Chief, Mineral Resources Division,
Mines Branch*

Department of Mines and Technical
Surveys, Ottawa, Canada



WE in Canada fully appreciate the problem facing the high-cost, or marginal, mines producing lead and zinc due to the decline in world prices for these metals. This sector of our industry in Canada is facing the same problem. Already some 15 lead-zinc mines in Canada have been forced to close down. In addition some of our largest and long-established producers have thought it desirable to postpone expansion plans and defer completion of projects already well beyond the planning stage. Conditions such as these are inevitable under the inexorable law of supply and demand; they are further accentuated when, through fear of shortages, such as were experienced from 1950 through to early 1952, artificially high prices upset the normal law.

We are puzzled at the apparent inconsistency of being requested officially, as recently as 1952, to divert more of our base metals to the United States, and then a few months later to be confronted with proposals for higher tariffs. What is even more important to us, however, is the seeming evidence of retreat on the part of the United States from the signified intention of removing, through reciprocal trade agreements, existing barriers to international trade.

High tariffs are employed for only one purpose, viz., to shut out from your market the product of some of other country. As such they can only give rise to resentment on the part of the injured country which must develop markets elsewhere and may even be compelled to adopt more drastic measures, such as export taxes on materials like nickel or asbestos, for example.

Unless you continue to buy from us, we will be unable to trade with you. What a pity if any artificial barriers were erected to preclude a continuance of such a happy relationship as now exists.

I understand the United States Tariff Commission is shortly to institute an investigation to determine the facts relative to the production, trade, and consumption of lead and zinc in the United States. May we express the hope that in the course of that investigation the sincere interest of Canada, and Canadians, in this question be not overlooked.

J. VUILLEQUEZ

Vice-President & Director of Sales
American Metal Co., Ltd.



OUR mines in Mexico are losing money at present prices and we are sympathetic with the mines in the United States which have the same problem. The most important influence on the increase in lead and zinc prices after Korea and their subsequent sharp decline was the United States stockpile program which, after acting as though it had an insatiable appetite, withdrew completely from the market. If this program had been well balanced over a period from 10 to 15 years, there would be no tariff discussion today.

Proponents of substantially higher tariffs on lead and zinc are concerned over maintaining sufficient production and adequate knowledge of mining skills in the United States for use in case of all out war. In the event of war, the United States would have ready access to the metals of Canada and Mexico. Sliding scale tariffs will not give the expected results. Sliding scale tariffs will encourage instability of price. High-cost mines will not benefit and mines in other parts of the world will suffer.

The United States is not self-sufficient for lead and zinc and even at the highest prices of recent years cannot produce enough to satisfy our needs. If tariffs were made high enough to shut out imports, prices here might well rise and allow some higher cost United States producers to operate but only for a short time; eventually competitive substitute materials would force a reduction in consumption and we would be faced with the same situation we have today.

The soundest measure for assistance to our mining industry for all producers is the bill sponsored by Senator Murray of Montana. His bill would accord certain subsidies and would provide that the stockpile would purchase a tonnage of materials at least as great as the tonnage subsidized.

The "seller's" market is over; the buyer can now choose. Aluminum, plastics and other materials have encroached on the uses of lead and zinc. Miners, smelters and manufacturers should concentrate on increasing current uses of lead and zinc and find new uses. They will ultimately profit more from these efforts than from any scheme that subsidizes the producer or taxes the consumer or the nation through subsidies or hidden taxes such as tariffs.

J. A. COSTELLO

Vice-President
Ethyl Corp.

AS A large consumer of lead, we have two principal concerns:

(1) It is most important that the supply of lead available to us at all times be sufficient; and (2) that the price should be steady and not excessive. In recent years there have been several occasions when the shortage of lead and the wide publicity given to it has had adverse effects on our business, and the attendant high prices have had retarding effects on the growing acceptance of our product.

Since 1939, the price of tetraethyl lead has decreased 7.6 percent. We are sure that had there been an increase in tetraethyl lead price comparable with even the com-

modity index, the tetraethyl lead industry would have been unable to increase its lead use from 30,000 tons in 1939 to 147,000 tons last year.

There is one other point in connection with lead price which, from a lead consumer's standpoint, is probably at variance with that of the producer. This concerns the relation between lead and zinc prices. We know that the producer has to consider total metal values from his ore to evaluate the earning power of his business. On the other hand, we who are lead consumers, and have little or no interest in zinc, do not feel that the price of our metal should be influenced in any way by conditions which exist in the market for the other contained metals.

Our company took a position in opposition to the sliding scale tariff recently proposed by the Congress. We did so first because we felt that the plan, as proposed, would not work as represented, and would create a chaotic price situation in the lead industry. More particularly, we felt that its effect would be diametrically opposite to what was hoped for in regard to supply and price.

Secondly, we think that the sliding scale tariff would have the effect of establishing a floor under the price of lead, without proper safeguard for protecting the ceiling. A tariff law, or any other law, which provides selective price protection to the producers in an industry, without similar protection to the fabricators and processors in that same industry, will ultimately work to the disadvantage of everyone concerned.

We, as a consumer company, are very conscious of the difficulties that beset the domestic mining companies when they are required to compete with the foreign producers for the same business in the U. S. market. We accept in good faith the statements presented that indicate a disparity in the cost of domestic mining versus foreign mining, and to the extent that this difference in cost can be demonstrated, we believe that there is justification for the existence of a tariff to compensate for it. Such a tariff, however, should be arrived at with due consideration to its effect on the U. S. price, and further, it should not be so high as to make it unprofitable for foreign companies to supply us with the metal that we need.

OTTO HERRES

Vice-President
Combined Metals Reduction Co.



I SHOULD like to comment briefly on the views expressed by the distinguished members of this panel who are opposed to protection for the domestic mining industry.

If we look to the foreign producer and importer for a solution to the problem of excessive imports troubling U. S. mines we are told that sufficient lead and zinc are available from Mexico and Canada to take care of our needs. But at what price when we no longer compete?

If there is any one instance in the world where free trade should be feasible probably it is between United States and Canada. Living standards and wages do not vary greatly between the two countries. But if such a program were proposed which country would raise the greater objections?

Does not the substance of our discussion come to the question of whether or not, in the interest of national security, the mining of such essential metals as lead and zinc in this country is an industry worth saving from destruction by imports? Or shall we be forced to compete

with the living standards and wages which prevail wherever the cheapest supply of raw materials can be found?

Is it in the public interest to permit an industry which is the largest of its kind in the world, and which is essential to national defense and security, to be priced out of existence by a flood of foreign lead and zinc offered at less than the cost of domestic production?

The President has stated that a strong domestic mining industry is vital to national security and the continued prosperity of the country. State Department officials contend that when a sufficient number of American mines have been wiped out prices eventually will come back to 15½ cents a pound for lead and zinc because of decreasing supplies. By that time many once thriving mining communities will be deserted and many families will have lost their homes. Is that good American policy?

Our first and supreme objective is to construct a peace that will save mankind from going further into a Third World War. But another stake we have in the contest is the wealth, resources and living standards of the United States of America. Destroying much of an industry essential to our national security will serve no good purpose toward the prevention of war.

TAXATION PANEL

Chairman

HON. THOMAS E. MARTIN

Member of Congress from Iowa

Government Expenditures and Mine Taxation

By **HON. TOM MARTIN**

Representative from Iowa



IN any discussion of our Federal tax policies, we must consider some of the factors which have brought about our existing heavy tax load. Our *big* tax bill is the direct result of *big* budget requirements and the latter to a large extent is caused by *big* Government operations together with the attendant costs due to extravagance, waste and duplication.

Our main problem during these hectic days and periods of unrest is one of curtailing Government operations within the limits of national security and the institution of efficient money-saving governmental practices.

Real efforts are being made by our Government to cut away the "fat," and reduce the scope and cost of administering vast programs both here and abroad. We, as American citizens, can demand that the cost of Government be cut on all fronts and we can insist upon a program of economy. The cost of our Government can never be reduced appreciably until we, the American people, decide once and for all to reduce our excessive demands on the Federal Government and to stop looking to Washington for a cure-all for all of our social and economical problems.

Meanwhile, we must face the important task of keeping alive our vital industries which are most vulnerable to

oppressive taxation. The mining industry is a prime example. I need not tell you gentlemen of the depressed condition in which we find large segments of our mining industry at this very moment. Excessive taxation has done such a thorough job of draining off the profits of our mining companies during the few profitable years that many are unable to weather the storm during the lean years.

Briefly some of the changes in our tax laws needed to restore health to our mining industry are:

(1) The over-all rates upon the income of individuals or corporations even during the period of emergency should not exceed 50 percent.

(2) The principle of allowing net operating losses for loss years to be deducted in determining taxable income of profitable years should be amended to allow full and fair allowance for net operating losses to mining companies.

(3) The limitation on deductibility of exploration expenditures should be removed.

(4) Progressive steps should be taken to eliminate double taxation of dividends.

(5) Allowable depreciation should be more liberally determined as to rates and methods.

(6) The percentage depletion law must be continued and liberalized.

(7) The rate of tax on capital gains should be reduced.

The Ways and Means Committee held hearings during June, July, and August in which the foregoing and other recommended changes in tax laws were presented. We hope to have a bill written during next year based on the solid foundation of these hearings that will include many necessary changes and will revise and make the International Revenue Code more equitable and workable.

HON. JOHN W. BYRNES

Member of Congress from Wisconsin



IF there is any evidence of a need for Congressional investigations, the revelations and results of the work of the House Ways and Means subcommittee on Administration of our Revenue laws certainly provides it. As a result of the Committee's work, a former Commissioner of Internal Revenue and an Assistant Commissioner are under indictment and awaiting trial. There has been a complete reorganization of the Bureau—administrative inertia has been replaced by determination to put the Bureau on a sound operating basis. Personnel changes have been made and machinery put into operation to detect wrongdoing and to eliminate from the service any person of questionable integrity or ability.

Honest taxpayers can take heart that we have today a man like Coleman Andrews directing the administration of our tax laws. He is a capable, practical and honest man. There are three major objectives of the present administration of the Bureau: (1) Decentralization, (2) Reduction of overhead and unnecessary operating costs, and (3) Adequate enforcement. Dollar savings in overhead are being used to carry out the third objective greater emphasis on enforcement.

Although there has been some criticism of a door to door canvass, conducted by the Bureau, the results to date prove the need and wisdom of the program. The first full scale canvass was made in New England which disclosed that

over 13 percent of the people called upon had failed to file some one, or more, of the required tax returns. Thus far, the canvass has paid off better than \$40 to \$1, i.e., \$40 for every dollar of cost. In one community, it was found that out of four persons called upon, one had not filed a tax return for 16 years, another had not filed for seven and two others had been cheating for several years. The liability of the first person will be substantial; the second person admitted a tax liability of \$30,000 for the seven delinquent years, liability for the remaining six is still unknown; the third fellow owed the Government \$180,000 and the fourth \$110,000 with penalties and interest to be added.

The astounding results of this canvass make one wonder whether we may not have the beginning of, if not a fully developed situation such as exists in France, Italy, Argentina, and other countries where evading taxes is more highly regarded than compliance.

HON. RICHARD M. SIMPSON

*Member of Congress from
Pennsylvania*



IT is hard to say at this moment what will be in the so-called tax revision bill which will be presented to Congress by the Ways and Means Committee next January. The intent of the bill is to correct a great many of the statutory and Administrative errors, to simplify the matters of levying and collecting income taxes and excise taxes; and, in short, to improve upon our present tax laws. There are limitations upon what the Committee can do as one small group and that limitation is the amount of money which the Treasury would lose by reason of the immediate correction of all the inequities now existing in our laws.

When the recent Administration took over the Government, they found a situation which caused great concern

and needs correction. It was discovered that there was from \$80 to \$100 billion worth of goods ordered for various purposes but not paid for. Today, after almost a year, we do not know the exact amount of these cash-on-delivery orders. What we do know is that all the money to meet all those obligations must be on hand and ready to pay those bills. To arrive at a sound financial policy as a proper basis on which tax reduction, highly desired by all, might be effected, you must take in consideration those unpaid bills of between \$80 to \$100 billion.

In the present year, for the first time since 1950, we have in this Congress authorized less by way of Obligational Authority, than our anticipated receipts. In other words, as of the end of this year, we will not be confronted with orders without anticipated revenue with which to pay. In short, we will then come to a time when a true balanced budget will be a certain result.

The tax bill would be a better bill, from the standpoint of the people, if we could spend \$3 or \$4 billion by way of adjusting our tax laws. This is not in the books. It can't be done. What we can do is to establish a principle which, while it won't give complete relief or completely correct the inequities existing today, can and will be effective in future years and be extended until that particular trouble is completely wiped out; as, for example, with respect to double taxation of business income. Another matter of great importance is that of depreciation. I am certain the Committee will look with favor upon some plan permitting the owner of a business or of the machines in a plant considerable latitude in determining how he may charge off that piece of machinery. There will be a limitation, undoubtedly, so that it can't be charged off in, let us say, less than five years. We are working hard to get some—not a definition of income—but rather to list a number of items which are not income; to make it clear so that controversy so prevalent in this field may be eliminated within certain areas.

Of great importance to your operations is the factor of depletion. On that I don't have anything to say on present and future legislation except that as a result of a study in 1950, some additions were made.

Only by the encouragement of business, can we properly provide employment for the millions of workmen in our country. The Committee is working hard on this tax revision matter and we believe the bill will be very well received by all the people of the country and I think it will be a monumental work.

The Impact of Taxation on Mining

By H. B. FERNALD

Loomis, Suffern & Fernald



THE greatness of our country, its productivity, the welfare of our people and our military strength have come from our system of private industry and individual initiative. This is also the source of our government revenues.

Basic to this whole economy is mining. Our industries, our employment and our ordinary lives rest on the products of the mines. Without these products, we should be as primitive peoples struggling for bare subsistence. This does not deny credit to those who make the products of the mines of use and benefit to our people. Give them

due credit, but what they do is only possible because they have the products of the mines.

The incentive for finding, developing and equipping mines, for devising and adapting methods and processes to make them of value, and for the effort and investment needed, is the hope that the occasional successful mine will yield enough profit to make worth while many losses. Most mining ventures never do repay even the bare investments. Taxes can kill incentive, because what the Government takes in taxes is not profit, nor even return of capital, to the investor; and we tax as profits what is really return of capital.

A major feature of present revision of Federal tax laws should be to find where tax rates or tax provisions are impairing or threatening the revenues.

We need great revenues for our government and we shall need them for years to come. Cut out waste, extravagance and superfluities; spend no more than is required efficiently to meet real needs; yet we need great revenues in continuing flow. A few of the points where taxation is impairing incentives and revenues are:

(1) Tax rates above 50 percent for corporations or for individuals do seriously impair incentive, and should be reduced.

(2) The double taxation of corporate profits and of dividends therefrom makes an excessive tax load which should be removed or greatly reduced.

(3) The tax rate on capital gains should be reduced. This will yield increased revenues.

Removal of the limitations on deduction of exploration expenditures; fairer allowance for losses; a tax free period for new mines; passing the depletion allowance through to stockholders, have been cited as urgent needs. Let me add briefly a few more points:

We do need better provisions for computing percentage depletion as to the mineral property and as to net income from the property. Depreciation should be more liberally allowed, as to rates and as to method.

Tax Relief Needs of The Mining Industry

By L. J. RANDALL

President
Hecla Mining Co.



AS tax rates have increased it has become very important and necessary that only the actual net income of an industry be taxed. The net income after taxes is the tool which labor and management must utilize in order to protect our American way of life and satisfy the needs of our society.

Over the years Congress has repeatedly offered all taxpayers an opportunity to recommend amendments to our tax laws and the American Mining Congress has always been our leading representative for the mining industry. Although many changes are still needed Congress has not been irresponsible to our requests.

Certain improvements in the law were made in 1951 but recommendations for a few further urgent changes are as follows:

(1) The limitations for deduction of exploration expenditures should be removed.

(2) Losses from unprofitable mining ventures should be allowed as deductions against taxable income.

Not more than one out of 100 mining ventures become profitable operations. Even the well organized mining company, with competent engineering and geology departments will hardly expect to find more than one profit-

Accelerated depreciation should be allowable in the early years of the life of depreciable property.

A strong, prosperous, continuing mining industry is needed as a source of government revenue. This we will not have if taxes kill incentives. To the extent we depend on foreign sources for minerals, we place our industry in time of peace, and our safety in time of war, at the mercy of foreign countries. Perhaps a strong mining industry is a greater need than our need for government revenues. But both will suffer if taxes impair the incentives for finding, developing and producing minerals.

able producer out of ten different exploration projects attempted. Certainly, the full loss incurred in unsuccessful mining ventures should be allowed as a deduction for tax purposes.

(3) The taxpayer should be allowed full allowance for losses suffered in loss years.

(4) We recommend a tax-free period covering at least three, and preferably five years of operation for a new mining venture from the date the mine becomes a commercial producer.

(5) Adequate allowance for percentage depletion. The present allowance for depletion, in the case of metal mines, is computed at the rate of 15 percent of gross income, provided that figure does not exceed 50 percent of the net income from the property. This limitation often has had the effect of reducing the maximum 15 percent of gross income allowance. Present percentage depletion rates for metal mines are not excessive for the industry as a whole and in fact are inadequate in many individual cases.

(6) Tax-free depletion allowance should be extended to shareholders.

(7) Double taxation of dividends to individual shareholders should be eliminated.

We all agree that some progress has been made in amending our tax laws to give a more equitable and fair means of taxing the earnings of mining companies. However, there is more to be done if mining is to survive as a private industry.

We should express to the members of Congress our appreciation for what has been accomplished and for their recognition of further changes needed to encourage the flow of risk capital into the mining industry. We should also express our gratitude to Mr. Fernald for his leadership and untiring efforts in bringing the need for these changes to the attention of Congress.



ELLSWORTH C. ALVORD

Alvord & Alvord
Tax Counsel
American Mining Congress

MR. Chairman, members of the American Mining Congress, I bring you good news. About eight months ago a wrecking crew was sent, by your vote, to Washington. I don't have to remind you that wrecking crews are essential only after a wreck.

Among the wrecks of the last 20 years was the government's fiscal policy. It was practically demolished. It will take a wrecking crew some time to determine what is left, what can be done by way of emergency repairs,

and to start us upon the road to an honest dollar. Headway is being made. Perhaps the depreciation of the dollar has been suspended if not stopped, and possibly we have reached the position where the credit of the United States can be maintained on a free money market.

A few of the other wrecks awaiting the new administration: the morals and morale of the Treasury; their brains, abilities, and willingness to work; their independence; their personal analysis and judgment; their impartial uninfluenced decisions. The wrecking crew, viewing the Treasury wreck, must have sent out an emergency call for more help. How much time to rebuild? Much, much more than you think. Probably more than the American voter will grant!

Now I am going to talk to you about matters other than those which are the particular concern of the mining industry. Our tax policy affects everyone. The job of every person in the United States is dependent to a very great extent upon the policies which are adopted by Washington.

I am confident that the Excess Profits Tax will die on December 31 of this year. The scheduled reductions in individual rates, I expect, will be forthcoming. However,

I cannot see a corporate rate of less than 50 per cent. What will happen to excise taxes is anyone's guess. I would not expect Congress to adopt a general sales tax, whether or not the Treasury recommends one. But certainly the existing mess needs overhauling. I seriously recommend to the Committee on Ways and Means that a 10 per cent tax on capital gains will produce more revenue than the 26 per cent tax which is based upon, and a true reflection of, the New Deal-Fair Deal policy of confiscating your capital.

Many of the technical, administrative provisions of the tax laws have to be changed if we are going to continue to spend at our present rate and tax at our present rate. The one vital factor essential to the free enterprise system of a country such as the United States is the continual growth of capital investment. If we are going to continue to let industry expand, we must adopt a policy which is in force in England, in Canada, and in most free enterprise countries except the United States; we must allow taxpayers to write off the cost of capital investments quickly. From the Internal Revenue point of view, the sooner the cost of your plant is written off the sooner you start paying more taxes. If I were the Treasury, the sooner this happened the happier I would be.

The limitations on the net operating loss carry-over must be removed. They were conceived solely to create discrimination against the mining industry. I trust this discrimination will end and you will compute your losses exactly as you compute your income.

There are many things I would like to tell you about which must be changed in the law and in the administration of the Internal Revenue Code. The Ways and Means Committee is working hard on its revision of the Code. Each of us here knows that the complicated, technical provisions of the present Internal Revenue Code have grown up over a period of many years to meet specific situations. So be careful when you attempt to simplify it.

One of the big problems that has not yet been solved—and it is only partly a tax problem—is how to encourage private investment abroad in order that foreign countries can buy the goods they need for their development and pay for them in dollars.

As Congressman Simpson told you, there was some 80 to 100 billion dollars committed eight months ago for expenditures which could not be uncommitted. Control of expenditures had been abandoned. Substantial headway is being made toward its restoration. Control is now being exercised by the people that you elected, instead of by persons appointed and not responsible to you. Coming into the new fiscal year, next July 1, you will begin to see the fiscal policies of the present administration take effect.

In spite of what you have been hearing, the industrial production during 1953 is about nine per cent better than in 1952. Nineteen fifty-two was an exceptionally good year. And individual incomes are higher than ever before dreamed of. National income is running in excess of \$300 billion. I fully believe a lower rate of tax will do more to maintain this level of production and income than any other presently considered policy with the possible exception of the adoption of a strong policy with respect to our import-export trade.

With respect to foreign trade generally: we must continue to export. We must continue to import. Our customs duties are not nearly so high as some think. Our restrictions (including tariff rates) are probably less than those of any other industrial country. How are foreigners to get dollars to pay for our goods? Either the Treasury—that is, taxpayers generally—or specific industries—that is, those which will be harmed by lower tariffs—must do so. I am awaiting the decision.

The President has a tough problem on his hands. In conclusion I would like to say this: Have confidence in the men who represent you. Give them a chance—what is good for the United States is good for you.

ROCK BREAKING

Chairman

JOHN J. CURZON

Manager

Chelan Div., Howe Sound Co.



C. A. Campbell



R. W. Van Evera

Recent Drilling Trends At the Calumet & Hecla, Inc. Mines

By **COLIN A. CAMPBELL**

Manager of Mines

and

ROBERT W. VAN EVERA

Production Engineer

Calumet Division

Calumet & Hecla, Inc.

CALUMET & Hecla, Inc., has been making tests on drilling equipment for the past seven years and has been intensively testing air-leg equipment for the past year. The tests cover drill machines, drill steel, and various types of bits.

The air-leg drill did not show up well until about a year ago when improved machines run by exceptionally able demonstrators showed up their real possibilities.

Results of the testing showed some slight increase in penetration rate by the air-leg over the previously used post-mounted 3-in. and 3½-in. drifters. The feet of hole drilled per miner-shift showed a definite increase. Correspondingly, tons per miner-shift went up. The increased penetration is a result of drilling a smaller hole with tungsten carbide bits. The footage increase is a result of more actual drilling time available. The tonnage increase is a result of this additional footage plus the ability to drill more evenly burdened holes with the air-leg equipment. Acceptance by the miner is a problem. We expect it to be solved by careful training and increased incentive earning potential.

Records on maintenance costs indicate no appreciable change will result from switching to air-leg equipment. Somewhat faster wear of machines and parts is expected but the lower prices on them nearly balances out on the total cost basis.

In testing drill steel it has been found that alloy steel outperforms carbon steel. Considerable difficulty was experienced in developing satisfactory fabricating techniques in our blacksmith shop. By working out one detail at a time, most of the problems have been solved. Intraset steel has done a good job but costs are high because rod failures necessitate discarding the tungsten carbide bit before it is worn out. Handling and regrinding costs are also high.

Bit tests established that the one-use bit used with an air-leg drill gives a good bit cost per foot, but miner-acceptance and over-all performance are lower. Intraset

tungsten carbide bits give higher cost over-all, but their miner-acceptance is good. Tungsten carbide detachable four-point bits give good costs, are well accepted, and give good over-all performance. Since gauge loss with tungsten carbide bits has been negligible, we have been able to increase penetration speed and cut powder usage by going to smaller holes.

Changes and improvements have been coming through rapidly and more improvements are expected in the future.



Mining Methods and Techniques in the Principal Metal Mines, State of Washington

By E. G. EASTERLY
Special Representative
Atlas Powder Co.

THE Holden Mine, owned and operated by the Chelan Division of the Howe Sound Co., is located on the east side of the Cascade Range in Chelan County about 90 miles northwest of Wenatchee, Wash.

The upper ore body reached a width of 100 ft. As a result of this great width it was possible to use "coyote" or powder blast methods of stope mining in former years. The blasts frequently were loaded with 25,000 lb of dynamite, which produced as much as 46,000 tons of ore.

As the 1400 level was approached, the ore body became narrower. Because of dikes, and because of the severe shattering on the hanging wall, as well as damage to permanent installations, it became apparent that new stope mining methods were needed. In the meantime, about 1940, the staff had noticed articles in the Canadian Mining and Metallurgical bulletins describing long-hole stope blasting at Noranda and Aldermac and subsequently began experimental work in various parts of the upper workings. In those days long-hole drilling for stoping was in its infancy and consequently many problems and headaches were met and overcome. These problems involved hole spacing, burden, hole diameter, types of powder, and whether to drill holes in a horizontal or vertical plane. For a number of years these long-holes were put in by diamond-drilling with Ax ($1\frac{1}{16}$ -in.) bits. Then, about 1948, after successful tests, jointed steel, two-in. tungsten carbide bits and four-in. heavy drifters completely replaced diamond drilling in stoping. The cost per foot of hole with heavy drifters and jointed steel was less than one-third the cost of the diamond-drill method.

The Knob Hill gold mine at Republic, Wash., is opened up on eight levels and serviced by a three-compartment inclined shaft. The ore body occurs as a gold-quartz fissure vein in andesite country rock.

Each stope has two miners who do their own drilling, loading, slushing and timbering. All drilling is done with $\frac{3}{8}$ -in. stopers using $\frac{7}{8}$ -in. alloy steel with tungsten carbide chisel type bits. The starter bits, $1\frac{1}{16}$ -in., are discarded after they have worn down to $\frac{1}{2}$ -in. With this type of steel the company has more than doubled the speed of drilling. It is not uncommon for a contract stope miner to drill 70 or 80 six-ft holes per shift and in some instances over 90. In view of these small holes, spaced on two-ft centers, 20 percent of the dynamite requirements are cartridges of $\frac{7}{8}$ by 8-in. and 80 percent are 1 by 8-in. cartridges. Forty percent semi-gelatin dynamite is used throughout the mine.

Even though wages and the cost of supplies have advanced, mining costs have been kept in line, by virtue of stope sand-filling, the use of small drill steel, the use of air trammers and the utilization of roof-bolts.

Deep Creek Mine of the Goldfield Consolidated Mining Co. is located about six miles east of Northport in Stevens County, Wash., and produces zinc and lead in a ratio of about $2\frac{1}{2}$:1. The ore body occurs as a replacement deposit in limestone. The mine, served by an inclined shaft, is opened up through eight levels, five of which are in production.

Stoping operations involve bench drilling and blasting of vertical down holes from one level to the undercut on the next lower level. These long-holes were formerly drilled with diamond-drill machines and a few still are, but the company is finding it more economical to drill long-holes with a three-in. percussion type machine using one-in. hexagon jointed alloy steel and two-in. tungsten carbide bits. Burden and spacing on these long holes vary from $2\frac{1}{2}$ ft to three ft, depending on fragmentation.

In the Metaline Falls area of Pend Oreille County, Wash., are two large zinc-lead producers, namely the Pend Oreille M. & M. Co., and the American Zinc Co., operators of the Grandview Mine.

Stope benches are drilled with a jumbo mounted on a D-4 Cat. The drilled holes average 10 ft in depth and are drilled parallel, both laterally and vertically on 42-in. centers with $1\frac{1}{4}$ -in. tungsten carbide bits.

When bench drilling with tripod mounted machines, two men on a drill averaged 100 ft of holes per shift. Now the same two men will get 300 ft per shift. These comparative figures in each instance include setting up, moving, loading and blasting.



Push Feed Drilling in The Butte Mines

By R. L. SANDVIG
Research Engineer
Anaconda Copper Mining Co.

THE principal advantages of the push feed drill are: (1) They reduce miner fatigue, enabling the miner to do more drilling, mucking, timbering, and "housekeeping" in a shift. (2) Push feeds are an all purpose drill. By virtue of their versatility, longer rounds are practical, less powder required, and the need for specialized equipment is much reduced. With push feeds cycles can be speeded up by intelligent adaptation of the drilling assignment to the mining problem, rather than adjusting the mining method to the limitations of the drill. (3) Less over-all drilling time is needed for a required footage of hole. This is because with long steel changes, or no steel changes at all, the push feed drill is penetrating rock from 72 to 93 percent of the drilling time. More important than the man-minute per foot factor is the reduction in the number of holes required to break a given volume of rock, accomplished by drilling holes parallel to the free face, that is, breaking a uniform burden throughout the length of the hole. (4) Less drill steel is required. A stoper requires 31 ft of rod to drill an eight-ft hole, while with the push feed, a minimum of 8 ft 5 in. to a maximum of 17 ft 6 in. will reach the eight-foot depth. (5) No auxiliary equipment is needed. Drill carriages, column bars and clamps, and transportation of the heavier equipment is eliminated.

Tungsten carbide bits have their principal advantages

mainly in enabling the driller to take advantage of the long steel changes. Where the ground is so abrasive or tough that steel bits become dulled in less than five or eight ft, carbide bits can rightly be considered a component part of the push feed drill, just as $\frac{3}{8}$ -in. hexagonal collared steel is equally as much an asset.

In choosing the best competitive push feed drill for Butte operations, handling characteristics, durability, effect upon carbide bits, drilling speed adequate to complete a standard round in the allotted time, and special features are given primary consideration.

To effect conversion of miners from stoper and drifter mining to push feed drilling and its adaptations requires a certain amount of demonstration and instruction to be successful.

STRATEGIC MINERALS

Chairman

S. H. WILLISTON

Vice-President

Cordero Mining Co.

Chairman, Strategic Minerals Committee

American Mining Congress



HON. A. L. MILLER

*Member of Congress from
Nebraska*

**Chairman, House Committee on
Interior and Insular Affairs**

THE first problem to be dealt with is that of lifting the secrecy which has surrounded the Government's stockpiling policy of strategic materials. I am sure the Kremlin knows what is going into the stockpiles and maybe what some of our policies have been in the past.

Federal Government seems to have rebuffed the American mining industry, an industry which has played an important part in the growth and performance of our great nation. Once mines prospered and there was production to meet the demands of our manufacturing industry but many mines have closed in recent years because foreign sources of minerals have been given preference through tariffs and other peculiar monetary manipulations in those countries.

The Stockpiling Act is seven years old and we are still planning with some of the same people at the head of the planning operations.

I think the spotlight of publicity must be turned upon the stockpiling program and all operations of Government.

You of the mining industry have been forced to deal with the stockpilers, price controllers, money lenders, foreign aid experts, the military and half-a-dozen other groups. The end result has been one of uncertainty and indecision. I think the philosophy of the stockpilers is that this is sort of a limited emergency; that war won't really come. I am sure if our military men, including the President, knew that that philosophy governed our stockpiling, it might come as a surprise to them.

The United States mining industry is sick; all of its symptoms point to a disease of too much governmentitis.

Hundreds of mines have been forced to close due to government meddling and policies unfriendly to domestic mines.

Recently an article in one of the newspapers, buried in the back pages and probably unnoticed by many, said this, "Of 76 materials on the stockpile list, ODM said that stockpile goals have been 75 percent or more achieved for about 38." That is only about half of the materials. What percent of the other half have been stockpiled? If we are short of certain materials, let the miners know about it so they can produce those metals needed. The proper price and tax incentive will provide for essential materials.

Congress has tried to encourage the development of our mines. It passed the Stockpiling Act of 1946, the Defense Minerals Administration was established in 1950. Both of these failed and DMEA was created. Congress supplied it the money and the authority to encourage mining development and exploration. Last April I introduced a bill to create a Federal Minerals Corp. which, among other things, would incorporate the 48 different agencies now dealing in some form of minerals; put them under one umbrella. I feel that this corporation could install good business practices in the Government, doing away with waste and actually give a helping hand. In the past, the mining industry has had to deal with too many.

I have painted a rather dark picture of the American mining industry. To be perfectly honest with you, you have been treated pretty rough. You have been the unsuspecting victim of government.

PANEL DISCUSSION—SHORTAGE OF YOUNG ENGINEERS

Chairman

BYRON E. GRANT

**Assistant to Vice-President & General Manager
Western Operations**

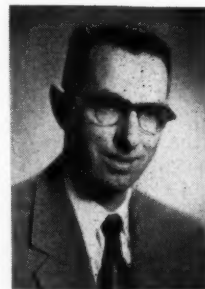
U. S. Smelting Refining & Mining Co.

Are We Wasting Our Engineering Man-power Resources?

By BYRON E. GRANT

*Asst. to V.-Pres. & Gen. Mgr. of
Western Operations*

U. S. Smelting Refining & Mining Co.



TODAY we have nearly half a million engineers, one for every 120 persons in the nation's working force. Eighty years ago there was only one engineer for every 2000 people in the nation's working force.

One wonders, with this rapid increase in the number of engineers, if the often repeated statements relative to the shortage of young engineers can be factual. Review your own experiences in hiring engineers for one answer. The Engineering Joint Council estimated a shortage of 25,000 newly graduated engineers in 1952. A continuing shortage is expected for several years to come.

We do know that, at present, there are not more than 12,000 engineers in the entire domestic mining industry, exclusive of petroleum and natural gas production. The

Journal of Engineering Education for February, 1953, reports that, for the 1952-53 school year, there were approximately 1300 senior engineering students in mining, metallurgy, geology and ceramics. In other words a best estimate is that there is available each year one graduate engineer in the mineral industries for every 12 or 13 engineers already engaged in the industry. This is encouraging if such a rate can be maintained. At present for the total engineering force in the United States the rate of replacement approximates one graduate engineer entering industry each year for every 18 or 19 engineers already engaged in industry.

The mining industry, like industry in general, is becoming more technical and specialized requiring an increasing number of specialists in management and service groups, and in the daily labor force.

A major problem confronting the mining industry is the one of absorbing and properly training the young engineer. That is, properly placing him to utilize his skills to the mutual, maximum benefit of the engineer and the company. He must be properly trained so that first, he knows how to get along with people, and second, how to get along with them while getting them to convert their labor and skills into products of industry. He must rub off a lot of specialization and take on a good deal of generalization.

Because so many young engineers are continuing into

advanced studies and research before entering industry, we may find it progressively more difficult to place these young men in jobs, such as in the labor force or as junior engineers, where the basic training for managerial positions is begun. His immediate talents may call for a more specialized job than that of a miner or a mill hand; but future requirements may call for the diversified experience and training mentioned above. This should begin at the outset of his employment. He can ill afford to go back and pick it up at a later date.

If there is any improvement to be made in this respect in our industry it could result from a somewhat more formalized management education or management development program.

Specialization tends toward isolation of action and thought. By a need for a more formalized management development program is meant one that emphasizes developing people so they can rub elbows with and get more cooperation from others; one that gets away from a hit and miss development of people; one that stresses the point that a man becomes a boss by virtue of his leadership and that leadership qualities are not inherent but must be cultivated and trained; and one that steps up the emphasis that management development or education is the responsibility of management people at all levels, from the line foreman or junior engineer to the top executive.

In the Coeur d'Alene District and Pacific Northwest

By C. E. SCHWAB*

Mgr. of Industrial Relations
Bunker Hill & Sullivan Mining & Concentrating Co.



Roy Hooper

BASED on the personal experience of many non-ferrous operations in the Pacific Northwest, there is no shortage of young mining engineers now. It is also their opinion that they will be able to meet their future needs, although this opinion is voiced with "fingers-crossed" because of the reduced numbers of young men enrolled in colleges for technical training.

Starting salaries range from \$325 to \$425. A median would be about \$375 per month. While competition has been keen with non-mineral industries, starting salaries in mining are thought to be in line with the competing industries. However, certain other items, such as definite promises of advancement in responsibility and salary in expanding industries, place mining at a disadvantage.

Industry in general has been criticized for "wasting" its technical men on routine duties. Odious as some of this routine work may be to the young mining engineer, his "text-book" education requires this on-the-job education before he can meet industry's needs.

It was of interest to note that our chief engineers, geologists, and metallurgists of the Northwest emphasize "quality." They feel that just having enough engineers is only half the problem. Most would prefer to be short in numbers, rather than in "quality." They have no quarrel with technical curricula but find our engineers woefully ignorant outside their particular technical field. This points more and more to a five- or six-year course with a broadened educational base.

While we feel there is no shortage now and that immediate future needs will be met, we are more or less dis-

turbed by some things we hear. The following is just an example:

Last spring the Spokane Chamber of Commerce solicited by questionnaire the Spokane high school graduates to find out what choices of professions were being considered. Of the 400 seniors who returned the questionnaire, only one was interested in the minerals industry and he expressed a preference for metallurgy. There was not one interested in mining engineering. Inconclusive as this may be, it can hardly be brushed aside and forgotten.

Equally disturbing to the lead and zinc operators is the possibility of further curtailment as market prices continue severely depressed. Projects or plans requiring additions to their present engineering staffs—or even work for their normal staffs—are shelved. In the event of a shutdown, technical men scatter just as fast as competent mine crews. "Boom or bust" in lead and zinc mining have caused these operators to honestly face the question, "If I were a young engineer would I apply for a job at a lead-zinc operation today?"

The Viewpoint of the School of Engineering

By DR. J. ROBERT VAN PELT

President

Montana School of Mines



THOSE of us in mineral industry education are one step removed from the daily problems of company operations. This allows us to view the mining industry, as a whole, with an eye to the future. One thing you can see is the increasing difficulty in supplying industry with the technical manpower it needs and demands.

The need exists in geology, mining, mineral preparation and metallurgy. Let us take a quick look at each of these. Geological principles assure us of many wealthy ore fields awaiting discovery. This means more geological engineers with new skills.

* Paper presented by Roy Hooper, Asst. Mine Supt., Bunker Hill and Sullivan Mining & Concentrating Co.

In mining, we anticipate better control of rock masses underground and steadily improved mechanical equipment. In mineral preparation, the trend is toward lower grades of ore. The future mineral preparation specialist will be a scientist as well as an engineer. In extractive metallurgy, the precise control of pyrometallurgical properties is receiving more and more attention. At the same time, chemical metallurgy is taking its proper place.

Most contacts with prospective engineers by the industry start with college seniors and recruiting officers on the campus. Some companies take interest even in sophomores. It is usually during his junior year that the student chooses his major field; hence the advantage of interviewing sophomores. In the summer following the junior year, the selected students are brought in as summer employees. This establishes mutual acquaintance before an offer of regular employment is made. If that program could be pushed down one year earlier, it might tempt young men to elect mining or metallurgy or geology rather than some other branch of engineering.

Many young men make their vocational choice in high school. To reach them, it has been suggested that a first-class motion picture be produced to tell the high school boy, his friends and parents what he personally will do if he becomes a geologist, mining engineer or metallurgist.

There are many projects, national and local programs.

Three of these have recently been proposed by a Committee of the American Society for Engineering Education. The first is to encourage the study of mathematics in high school.

A second, is that industry offer summer employment to high school teachers of mathematics, physics and chemistry and to vocational instructors in order to acquaint these people with company operations and policies.

The third, is that high school and college teachers be encouraged to study the company's operations and use the resulting data as teaching material in economics or economic history or labor relations.

A well-rounded program to encourage mineral engineering will go beyond high school and college to the general public.

After young men have entered mineral engineering, they must have the best possible opportunity to grow. The success of such a program depends on being put in the hands of highly qualified personnel with the necessary assistance for it.

In conclusion, the long-term need can best be met by long-term planning and active, well-staffed programs. Because top policies are involved, top level decisions are needed in order to start and maintain a program. The money needed can be fully justified on the practical basis of the welfare and progress of the company itself.

Future Aspects and a Program of Correction

By **RICHARD A. YOUNG**

Vice-President

American Zinc, Lead & Smelting Co.



A SURVEY made by the Engineering Manpower Commission of the Engineers Joint Council last year showed that industry reported a need for 40,000 new engineers per year. In that year, 29,420 received their first engineering degrees. Of these 6100 or about 20 percent were immediately commissioned in the Armed Forces as a result of R.O.T.C. We don't know how many of the remainder were drafted or enlisted.

The 1952 graduating class was relatively large compared to the classes for the next three years. The engineering class of 1953 was only about 23,000. The 1954 class is estimated at 19,000, and the 1955 class at 22,000. The number enrolled in R.O.T.C. increases greatly during these years. Of the class of 1953, 23 percent were in R.O.T.C., 45 percent of the class of 1953, and 55 percent of the class of 1955.

Now it is obvious that the competition for engineering graduates in the years ahead is going to be terrific. Thus the advantages of majoring in the electrical, chemical, mechanical and civil fields will certainly be emphasized by the industries which have a crying need for these types of engineers.

How will the mining industry fare in this competition? Well, let's see how we are faring now. The U. S. census of 1950 reported a total of 519,000 professional engineers in this country. Of these, approximately 5 percent reported themselves as mining or metallurgical engineers. In October of last year the U. S. Office of Education made a survey of the number of students enrolled in each branch of engineering. In the class of 1953, 3.8 percent of all engineering students were enrolled in mining and metallurgy. In the class of 1954 the percentage had

dropped to 3.1. In the class of 1955 it had dropped to 2.3 and in the class of 1956 it was down to 1.6. With normal attrition, 167 mining engineers and 312 metallurgists will be graduated in 1956. This compares with 412 mining engineers and 580 metallurgists graduated last year, a year in which the total graduates about equalled the estimated total for 1956.

What should we in the mining industry do about this shortage of engineers? Here is a suggested program:

First, do all we can to help increase the number of men who enter and graduate from our engineering schools.

Second, Engineering Manpower Commission has suggested that companies establish scholarships for engineering students or offer part time work to help students finance themselves.

Third, check the high schools in our communities to make sure they have adequate science departments.

Fourth, publicize the advantages of engineering as a career to all high school students and their parents in our communities, and especially to our employees through our house organs, bulletin boards, etc.

Fifth, put our advertising to work.

The next step in our program is to insure an adequate supply of mining and metallurgical engineers and geologists. To do this we must publicize to freshman engineering students the advantages of engineering in the mining and metallurgical fields.

Whatever we in the mining industry can achieve toward increasing the number of engineering graduates qualified to enter the mining industry, cannot possibly help us materially before 1958. In the meantime, the third part of our suggested program for relieving the engineering shortage must of necessity be to improve the utilization of the engineers which we now have in our companies.

We can and should encourage young employees to study engineering at night, promising them advancement when they have completed their courses.

We should encourage selected engineers to take graduate training to increase their value to our operations and assist them in financing such graduate study.

Engineers and professional men have had many complaints in the past, particularly concerning their lack of status, their isolation and their lack of information about their company, its plans and the management thinking. It isn't necessary today for engineers to continue to work for a company whose personnel policies toward engineers are antiquated or haphazard.

LABOR RELATIONS

Chairman

CHESTER H. STEELE

Vice-President

Anaconda Copper Mining Co.

Revision of Taft-Hartley Act

By **CHARLES R. KUZELL** and **DENISON KITCHEL**

General Manager

Phelps Dodge Corp.

Attorney

Phoenix, Ariz.

FULL text of this paper will appear in the January, 1954, MINING CONGRESS JOURNAL.

PANEL DISCUSSION MINE INCENTIVE PLANS FOR GREATER PRODUCTIVITY

Chairman

ROSS D. LEISK

General Manager

Sunshine Mining Co.

Underground Incentive System at Iron King Branch

By **H. F. MILLS**

Manager, Iron King Branch

Shattuck Denn Mining Corp.



AN early type of incentive system, based on tons per stoping shift, with bonus paid to the entire mining crew, was abandoned because of difficulties encountered during the transition stage from shrinkage to horizontal cut and fill method. In 1946, we substituted a bonus system based in the stopes on cubic feet of ore broken per shift, and in drifts and crosscuts on a bonus per foot of advance over a given base. Raises have been maintained on a straight footage basis.

Initial rates were based on past production rates at Iron King and on information obtained from other producing mines. After the plan had been in operation long enough to gain more exact information some changes were made in the relative amount paid for each component of the full stoping cycle, but the only change in rates for the full cycle was a 5 percent reduction, equivalent at that time to a 15 percent reduction of bonus above wages. This was done in 1950 to compensate us for the additional cost of tungsten carbide bits over the cost of hot milled bits, which had previously been in general use, and was done with full consent of the men.

It is noteworthy that bonus rates have not changed upward during a period in which wages increased 44 percent plus fringe benefits. The normal effect of a wage

increase is to reduce bonus earnings over day's pay, but we have found that during the second bi-weekly payroll period following a wage increase, average bonus payments are back to normal, indicating that there is a reserve of individual production capacity which can be drawn on.

We have placed no top limit on bonus earnings; at times bonus exceeds day's pay.

Advantages of the system are that with a high daily output per man, not only are fewer miners required but also fewer "service" men; and with a very low labor turnover, a minimum amount of supervision is necessary for experienced miners.

The disadvantage is that only the men at the face receive the bonus; these number less than 50 percent of the men on the mine payroll.

The bonus system is not part of our union contract with the local union.

Incentive System at Potash Co. of America

By **G. F. COOPE**

President

Potash Co. of America



IN 1943, during World War II, the company found the productivity of its workers had decreased consistently and substantially over the period since the early days of the war.

The reasons for this were: first, lack of qualified men available in the labor market. Our practice had been to hire men with a high school education or what we considered its equivalent in experience. Second, and as a corollary of this, indifference of the workers as to individual performance, since men were so scarce and jobs so plentiful.

Since wages were supposed to be stabilized and as a matter of fact the help to be obtained from any increase would have been little or none, we turned to a production bonus, which was permissible under existing regulations.

We were unable to set up the sort of bonus system we wanted, that is to give individual or small group compensation for specific effort, and finally accepted an over-all plan which would allow individuals to benefit without corresponding performance.

However, results were immediate. The plan was installed with a datum, or zero bonus line, several percent above existing performance. The downward trend was immediately reversed and in the first month the datum was crossed and the upward trend continued to a much higher level in succeeding months and years.

To allow mechanization and process improvements, which would permit production not related to the workers' efforts, the base of the bonus was changed in 1947 and again this year, or twice in ten years.

The method of reaching an agreement on a change in the bonus base was similar in 1947 and in 1953. Basis for both changes was mechanization and process improvement resulting in increased production.

The major instrument used in effecting the 1953 change was a news release covering a \$3,000,000 modernization and expansion program. This was explained in a brochure dated February 22, 1953, released simultaneously to all supervisory personnel, other employees and the unions.

Actual negotiations were carried on with the union leaders. After a reasonable amount of discussion, they accepted for the electricians, the mine, mill and a little later for the machinists.

Incentive System at Grandview Mine

By D. I. HAYES

Western Manager

American Zinc, Lead & Smelting Co.



DURING January, 1952, we began the organization of a mechanized mining system built around the newly developed "Gismo." The Gismo is a self-loading transport, convertible into a multiple drill stope jumbo.

The mine normally produces about 850 tpd. During January 1952, the mechanized system produced 16.1 percent of total mine production and the tons per man-day in the mechanized area was 33.4. These figures improved from month to month. By September, 76.2 percent of the production had become mechanized and the tons per man figure had increased 74.9. During March 1953, the mine production became 100 percent mechanized and tons per man-day reached a high of 106.6 by September.

In eight months the tons per man figure had been increased from 16 to 70, and it was thought that close supervision had pushed tons per man up about as far as possible. It was realized that the potential for further improvement was substantial, but it was believed that improvement could only be acquired by some sort of an incentive method.

Unusual Incentives as Applied in Latin America

By J. C. ARCHIBALD, JR.

Manager

Texas Mining & Smelting Div.
National Lead Co.



A TRUE incentive plan with certain types of Latin-American labor is impossible. We all recognize the stimulus of additional pay as one incentive to increasing output. However, some Latin American laborers object to working regularly and are satisfied with minimum requirements of food, clothing and other essentials. Obviously, an incentive plan for such persons must be different, and requires program of education.

In many mining operations, a lease or "buscon" system has been developed to enable an individual to work when and, as long as he wishes, doing only the amount of work he feels necessary in his particular case.

By definition, a "buscon" leases, on a royalty basis, certain sections of an operating mine and is free to deliver his ore, upon payment of the royalty, to any buyer he chooses. Therefore, the company must make attractive to the "buscon" the delivery of his ore to it. This can be effected by several means, but best results are realized by making the delivery of the ore to the company more attractive than any offer.

This is accomplished through a combination of material and less tangible aids. The material aids consist of sale of food and clothing at cost, and the sale of corn, which is the main food, at a price as low as one-quarter of actual cost. The sale of corn is contingent on delivery and sale of certain minimum amounts of ore, which may vary, depending on the class of ore delivered.

During the latter part of August and early September an incentive proposition was proposed to six men—four operators of the Drilling Jumbo (two on a shift—day and night shift) and one operator of the "Gismo" for each day and night shift then producing about 500 tpd delivered to the central transportation system.

The proposition was that the company would pay as a bonus to each of the workmen on the production crew in the mechanized area a percentage of his total day rate earnings for a payroll period. This percentage figure was one-half of the percentage that the men were able to improve during any payroll period over 65 tons per man. The men refused to accept this proposition. They later agreed to accept it on the basis of 75 percent of the total percentage improvement over 65 tons per man.

This incentive system was put into effect about September 8, 1952. During September, the bonus percentage was 11.37 percent. Average monthly bonus per man was \$38.68.

Until February 1953, the bonus increased rapidly from month to month, as there was no limitation on the tonnage the men could produce. One-hundred percent mechanization of all production was limited to mill capacity which was about 850 tpd. If storage facilities were available a week's mill capacity could be produced in five mining days, in which case monthly bonuses would be increased to about \$200 per month.

From an accounting standpoint, the percentage method of computing bonuses is very simple as it automatically takes care of pay for work in excess of 40 hr. Otherwise, it automatically adjusts different wage rates as between men who work regularly and those who do not and for change in personnel or for temporary substitutes.

When dealing with those who react to incentives as we understand them, the effect of paying incentives direct to the men involved when working on regular company-payroll is interesting. When certain headings were contracted to a contractor, he almost always retained for himself the full amount of the bonus, paying those working with him the minimum wage for the job. Any increase or decrease in lineal price had no effect on the men doing the work. So the company undertook the payment of the men themselves, prorating the bonus price on the basis of wages earned. The effect was to reduce over-all lineal costs 25 percent at a time of rising prices for explosives and related materials.

Nevertheless, experience has shown the greatest incentive on any job is a reputation for fair-mindedness, reasonableness, and equal treatment in all cases.

Summary of Incentive Plans at New Park Mining Co.

By CLARK L. WILSON

Vice-President & Manager of
Operations
New Park Mining Co.



DURING the development period of the mine prior to 1940, the split check type of lease was used in which the company furnished all supplies and the worker received 50 percent of net ore sales for his labor.

During the same period, employees accepted company stock as part of their day's wages. The two-fold purpose of this plan was to interest the employee in company progress and to ease the payroll burden during the development of the property.

The contract system of mining has been used extensively throughout the history of the company. At first only development drifts, cross-cuts and raises were contracted. Gradually this was expanded to include all mining operations.

Three incentive plans have been used. The first was based on average net smelter returns per man-shift worked during an eight-month period. An average ore value was established estimated to pay all expenses and provide a reasonable reserve for dividends. Then all employees, except officers, were paid 55 percent of the amount in excess of the established base value per man shift worked. This was paid to employees as a percentage of their total earnings. This plan was discontinued at the time of a general wage increase in 1946.

The second general incentive was known as the "Share Production" plan, introduced on January 1, 1949. This plan was based on the ratio of labor to "production values." Production values represented the balance of income remaining after all expenses, except labor, were deducted from total income. Employees were guaranteed 61 per-

cent of monthly production values. If this amounted to more than the payroll, an employee bonus was paid. This plan was discontinued as decreasing lead-zinc prices of 1949 eliminated profits from our operations, and eventually resulted in closing the mine for a short period of time.

The third incentive plan was inaugurated January 1, 1953. We wished to have this incentive involve ore grading, tons, and operating expense. We also wished to have some recognition of individual effort. Under this plan, the company sets aside each month, as a bonus fund, 25 percent of the net profit before Federal taxes. Also, each month, supervisors rate individual employees on their quantity and quality of work, plus adaptability to general mine operations. The product of rating value and hours worked is used as a basis for distributing the bonus. We are very encouraged with the success of this plan during the six months that it has been in effect.

New Park has recently adopted a "Restricted Stock Option" plan that permits key employees to purchase company stock. It is hoped that this investment will tend to stabilize the employees of our staff organization.

NEW MINING DEVELOPMENTS

Chairman
ROY A. HARDY
Consulting Engineer
Gatchell Mine, Inc.

Recent Development At the Copper Mountain Mine

By **L. T. POSTLE**
Vice-President & General Manager
Granby Consolidated Mining
Smelting & Power Co., Ltd.



COPPER Mountain mine is in southern British Columbia close to the United States border. Granby, famous for the "Granby" car, is one of the oldest mining companies in Canada. Formed in the Grand Forks district of British Columbia about 1900, its major sphere of interest was later transferred to Anyox and finally to Copper Mountain.

Average grade of ore mined has been under 1 percent since 1949 and the long rail haul between the mine and mill, coupled with an obsolete concentrator and a refractory ore where recoveries over 80 percent are difficult, means that the mine must be operated in a very inexpensive manner.

In the early days the ore was broken by rock drills and drawn off through grizzly chambers into mine cars. During the last war two major changes were made. Grizzlies were replaced by concrete lined scraper drifts, and the mining method was changed to caving, with horizontal diamond drill blastholes from raises in the lower portions of the ore bodies. The change to caving and scraper drifts enabled the company to continue operations in the face of rising costs and a fixed copper price.

Other major changes in the mine have been to replace the heavy, column mounted, drifter drills with lightweight,

jackleg machines and integral tungsten-carbide tipped steel for all development work. Efficiency of tramping in lateral development has been greatly increased with the use of air trammers, and large three-ton cars, dumped by means of air cylinders connected to the trammer. These units reduced the cost of driving short drifts and crosscuts.

During the past year the blasthole diamond drilling under the stopes has been entirely replaced by percussion drilling. The use of jointed steel drill rod and detachable tungsten carbide bits with a 3½- or 4-in. heavy drifter has drastically reduced the cost of blasthole drilling. Drilling now costs 55 cents per foot with percussion drills, compared to \$1.07 for diamond drilling. Furthermore, the larger holes (2½ in. compared with 1½ in.) drilled with the percussion drills allow greater burden and 4.23 tons per foot of hole are broken compared with 2.77 tons when using diamond drill holes. Holes are ordinarily drilled 60 to 100 ft, but they have been drilled as deep as 140 ft.

The heavy concrete lining necessary in almost all the scraper drifts is very expensive, especially when the gravel must be hauled several miles to the mine and then is not very good quality. Investigation showed that waste rock from development headings made cheaper, better, concrete aggregate than the gravel. The design of an underground plant to prepare better aggregate is receiving consideration.

To find more new ore, the mine and adjacent areas have been given very careful geologic study, followed by core drilling. The limits of ore bodies are investigated in great detail, before mining plans are prepared, to reduce the dilution inherent in a caving system.

There are many surface exposures of what might be copper ore close to the mine. A careful study has been made of these to find ore to be mined by surface methods. Three areas were diamond drilled. The first of these, the Princess May area, was drilled by vertical holes on 100-ft centers. This outlined an ore body containing over 1,000,000 tons which could be mined by shovels. Furthermore, there was an old working to surface close by into which ore could be dumped and then removed through the mine haulage system.

Shovels and trucks were rented and an open pit operation was started in the summer of 1952. Mechanically this was a success, but the ore proved very difficult to treat.

In a second area, vertical drill holes did not indicate any ore. However, old holes did offer encouragement, and mining was started on an exploratory basis at two points where small masses were clearly indicated. It is doubtful whether any profit was made, but there was sufficient encouragement to justify further work.

In the fall of 1952 it was decided to cut a trench 20 ft deep and 30 ft wide across a promising area. This trench

cut through about 200 ft of oxidized barren rock before it exposed one of the more sizeable ore bodies at Copper Mountain. About 70,000 tons have already been mined with additional positive ore reserves of about 150,000 tons. Geologic mapping after this pit was opened showed that the copper minerals occur in closely spaced parallel fractures. A new program has been laid out to drill at right angles to the fractures, and the first few holes have shown that a major ore body is present.

Efforts are being directed to develop a third area for open pit work, and a small one has been located containing about 100,000 tons of ore. An adjacent area is extremely interesting but cannot be drilled because of underground mining. The surface has been carefully sampled and it is intended to strip the surface to mine it without first determining its size or metal content.

All open pit work so far has been experimental. There have been insufficient ore reserves to justify the purchase of heavy equipment commonly used in open pits. One wagon drill was secured when this work was started, but it could not compete with 50-lb jackhammers using tungsten-carbide tipped steel. These light machines drilled holes as deep as 30 ft and the miners were accustomed to using them, so they produced broken rock at a reasonably

low cost. Recently experiments using different types of bits with the wagon drill showed better results.

Two diesel shovels are currently in operation, a 1½-yd and a 1½-yd shovel. Both are rented on a per hour operated basis. Trucks are similarly rented from small contractors and individual owners. The conventional three-ton truck hauling an average load of six tons has proved flexible and suitable for preliminary work. Recently some larger trucks hired have sharply reduced haulage costs.

Road building has proved inexpensive. One very good stretch about a mile long was built with a bulldozer in five days at a total cost of slightly over \$1,000, exclusive of surfacing.

So far all ore mined in open pits has been dumped into old mine openings and drawn off into mine cars for haulage sometimes more than one mile, to the crushing plant. There is currently under construction a 50,000-ton bin cut into the rock above the crushing plant. Trucks from the pits will discharge into this bin, whence the ore will be hauled about 500 ft to the crushing plant.

As this is being written, 1500 tpd is produced in the pits. On completion of the above-described arrangement, one-half of the required mill feed (5000 tpd) will come from this source.

Roundup of New Non-ferrous Mining Projects

By R. H. RAMSEY

Editor

Engineering & Mining Journal



EVEN a partial listing of the new nonferrous mining projects now under way, or definitely planned, in the various mining areas of the world indicates clearly a scale of investment without precedent in mining's history.

In the U. S. alone, actual or planned investment in new mining projects now reaches the following total:

	Investment (approx.)
Copper	\$356,000,000
Lead-Zinc	79,000,000
Aluminum	626,500,000
Other metals	107,000,000
Non-metallic minerals	85,000,000
	\$1,253,500,000

Investment in new mining projects outside the U. S. must at least double these figures.

Simultaneously with this surge of project development, something approaching a revolution is taking place in the techniques used by the mining industry. Many, although by no means all, of the new mining projects will make use of these new techniques.

In underground mining, roof-bolting, airleg drilling, large-capacity loaders, diesel-powered equipment, millisecond blasting, are being combined in various ways to cut production costs.

In open pit mining, 50-ton trucks (and shovels to match) are now available. With torque converters and power steering, they handle as easily as passenger cars. Rotary, oil-well type, drill rigs are turning up in many pits for blast-hole drilling. At one porphyry copper project, rotary rigs drill up to 40 ft of 7½-in. hole per hr.

In milling, growth in use of cyclones for all manner of classification jobs is the outstanding development. White Pine Copper Co.'s new mill exemplifies it.

Of greatest general interest, however, are the new processes being tested by such new projects as those of Sherritt-Gordon, Howe Sound, Kennecott, National Lead, M. A. Hanna, New Jersey Zinc, Freeport Sulphur and others. Some of these, like Sherritt's ammonia leach and pure nickel and cobalt precipitation technique, seem to be working out quite well. Others are still wrestling with mechanical or chemical problems, but in none of them do the problems seem insurmountable. A lower-cost titanium process, for example, seems not far distant.

Steel Rail Sets at Resurrection Mine

By WILLIAM R. DOYLE

Newmont Exploration Ltd.

Full text of this paper appeared in the October, 1953, issue.

New Developments in Iron Ore

By R. W. WHITNEY*

General Manager, Minnesota Mines

The M. A. Hanna Co.



E. S. Mollard

THE demand for iron ore is directly related to the demand for steel. To meet the needs of a growing population it is estimated we will need 145,000,000 tons of iron ore in 1970. These increased needs will be filled from two sources—hi-grade concentrates from taconite beneficiation and imported high-grade ores.

These sources plus the remaining high grade and concentrated ores of this country will supply the needs of our steel industry in the years to come.

* Read by E. S. Mollard, M. A. Hanna Co.

Three factors affect the reserves of iron ore: the price of iron ore, increased efficiency of equipment, improvements in the art of ore dressing.

Since 1930 the Lake Erie price of ore has increased from \$4.80 per ton to \$10.10 in 1953. Many iron ore properties or projects that were not feasible at low prices now are economically sound. Mining methods have undergone almost revolutionary changes in the past two decades and great strides have been made in methods of beneficiation. The future undoubtedly will bring many developments.

In 1952 there were 50 concentrating plants in Minnesota which produced 20 million tons of concentrates or 31 percent of total shipments for the year.

Since 1930 iron ore reserves in Minnesota have been increased due to the above three factors. The increase from 1930 to 1940 was 220,000,000 tons; and from 1940 to 1950, 390,000,000 tons.

Developments in taconite concentration probably are the most spectacular from the viewpoint of operators in the Lake Superior district. Fulfillment of plans of three projects under way in Minnesota will cost more than \$500,000,000 based on present estimates.

NEW HORIZONS FOR MINERALS

Chairman
PHILIP R. BRADLEY, JR.
President
Pacific Mining Co.

Alaska Development

By **HON. B. F. HEINTZLEMAN**
Governor of Alaska



WITHIN the last four or five years, there has been a growing conviction among public officials directly interested in Alaskan development that we should attack our development problems more realistically and intensively.

This down-to-earth approach came into being with the announcements of those marvelous projects, the Kitimat aluminum enterprise and the Prince Rupert pulp mill in British Columbia; the great surge ahead in petroleum and gas production in Alberta, and the Ketchikan Pulp Co. plant just inside the south border of southeast Alaska. In studying the preparatory work for these large developments, we became convinced that detailed facts would have to replace the generalized statements of our potential wealth which had been so widely used in the past. The successful launching of the above enterprises had shown us that we would have to get down and take stock.

We are drafting plans to have Federal and Territorial agencies, corporations, and individuals who have a stake in Alaskan development cooperate more fully and do a better job of collecting and analyzing facts. Alaska is on the threshold of a very substantial growth based on the use of natural resources and the employment of private capital. All agencies, public and private, concerned with

In the case of the taconite plants in Minnesota, the raw material is ground to —100 mesh, magnetically separated and followed by pelletizing, sintering or nodulizing since their application is to the magnetic taconites.

Two projects are under way in Michigan for treating non-magnetic taconite. Developments there eventually will be applied to solve problems in Minnesota.

Probably the most notable of new mines, outside of the Lake Superior district, is the Grace mine of the Bethlehem Steel Co. in Pennsylvania.

Iron ore production from Canada will be greatly increased in the next few years both by expanding existing producers and from new properties. Imports from South America and Africa will play an important part in supplying the needs of the steel industry.

The steel industry and mine operators are well aware of the need for increasing the iron ore supply for future years. They already have made great strides in assuring an ample and dependable supply. Projects now under way total at least 45,000,000 tons of iron ore yearly with the probability that tonnage will be expanded to 52,000,000 tons per year by 1960.

Alaskan development, are working harder and closer together than ever before to achieve the desired end.

Information on prospective mining and other projects is constantly becoming more dependable and more nearly complete. The great job of resource inventorying in this huge territory is making progress; processing problems and the investigation of possible market outlets are being studied more carefully, and we are looking into the need for any changes in laws, federal and territorial, general or specific, under which a given resource is made available for use. Consideration is also being given to the possibilities for tax inducements to foster new industries. Our promotional work is being made easier by the improved water transportation methods now being installed.

We particularly want to attract mining enterprises. We believe that mining must be the real foundation of an expanding economy of the greater part of this immense territory of nearly 600,000 square miles. We invite you to look into Alaska's possibilities, and promise you our hearty cooperation in your investigations.

Opportunities in Uranium Mining

By **THOMAS E. GILLINGHAM**
*Chief, Physical Exploration
Branch, Division of Raw
Materials
Atomic Energy Commission*



THREE nuclear power plants to drive submarines are in various stages of planning or construction; similar plants for surface ships and for airplanes are being considered. Many authorities predict that within ten years the first civilian-operated nuclear power plant for generating electricity will be an actuality. These remarkable developments and the still paramount military requirements bespeak a continuing and undiminished demand for uranium ore.

The basic price schedules and the various incentive payments for domestic uranium ores have been established by the Commission in a series of circulars, the first of which was issued in April, 1948.

With regard to future prices, I can only say, at this moment, that there is no indication that the demand for

uranium will lessen within the next ten years. In the atomic energy program there is no substitute for uranium.

For the next ten years most of the world's uranium will come from the types of deposits that now yield the bulk of the production. These are (1) the pitch-blende-bearing veins and shear-zones, (2) the reefs of the Witwatersrand and the Orange Free State, and (3) the relatively flat-lying deposits of the Colorado Plateau type. There are other types of deposits, particularly the uraniferous phosphate formations and the black shales, which are potentially large producers; and there are still others, such as the pegmatitic deposits, which are of little more than academic interest. But in seeking opportunities in uranium mining in the Western Hemisphere, unless we are a large company interested in by-product uranium production from low grade sources, we come back inevitably to the first and

third types mentioned above—the veins and shear zones and the Colorado Plateau type deposits.

The A.E.C. Exploration Branch and the U. S. Geological Survey do all they can to assist the uranium miner to find new ore. In fiscal 1953, the A.E.C. and the Survey drilled 1,136,893 ft of hole on the Colorado Plateau alone. This drilling was mostly of widely-spaced exploratory sort. The Government's policy is to do no more than is needed to interest private capital in a particular area. The drilling is based on the best available geological indications, irrespective of the status of land ownership. Both the small miner and the large company are benefited by this work.

The Government offers assistance in other ways also. Loans for drilling and underground exploration are made by DMEA, and access roads into promising new uranium areas are built by the Bureau of Public Roads.

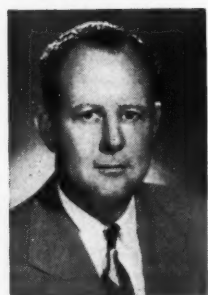


Clyde Williams

Research—Foundation for Mineral Progress*

By CLYDE WILLIAMS and
DAVID C. MINTON, JR.

Battelle Memorial Institute



D. C. Minton, Jr.

LONG-RANGE prospects for metals production in this country are very bright. This does not mean, however, that individual metals will have easy going. On the contrary, the competition will be rougher than ever before in history, because of the fact that we are in a period characterized by a variable technology which stands as a sword, ready to cut down the growth potentials of those metals not embracing it, or to thrust to new heights the metals that grasp and use it.

Developing at this very moment in our laboratories are things that presage great future industrial activity. The light metals, aluminum, magnesium, and titanium have their futures fairly well plotted for them. Aluminum, because of its good conductivity and low density, will share heavily in future electrification. It will also find increasing use in heat-exchanger mechanisms, and as a structural material, both for stationary and mobile structures. Aluminum-coated steel is in the pilot-plant stage of development and is already being used for some commercial products. Aluminum, and even magnesium, will be used increasingly for die casting.

Magnesium has great possibilities as a structural material for aircraft, and in the manufacture of portable tools and equipment. Titanium, because of its weight-strength ratio and corrosion resistance, has potentialities in transportation, in chemical processing, and even as a decorative metal.

The nonferrous metals, copper, lead, zinc, and tin, have so many old-established uses that their consumption will continue to rise with the increase in population and improvement in scale of living. Special uses in dynamic industries will cause greater than normal demand. This growth will require vast quantities of the old nonferrous

metals. The application of electronic data-processing and control machinery to business and industry will bring heavy demands for copper, zinc, lead and tin. With machines in the future replacing the human brain and nervous system in production, copper may readily become the primary "nerve fiber" of industry. Atomic energy could conceivably skyrocket the demand for lead and copper, in particular. Electronic developments will strengthen the growth potentials of all the old nonferrous mineral industries.

The big variable in the future of all minerals will be technology. Research will be the deciding factor that determines what share of new business goes to the individual metal.

Research will be highly competitive. Each metal, in its technology, must compete against other metals and against the nonmetallics. The older nonferrous, particularly, will have a battle to make their "use research" more effective than the "conservation research" of their markets.

OPEN PIT MINING

Chairman

WALTER A. STERLING

President

Cleveland-Cliffs Iron Co.

Churn Drilling and Heavy Percussion Drilling at the New Cornelia Open Pit

By JOHN A. LENTZ, JR.

Mine Superintendent

New Cornelia Branch, Phelps Dodge Corp.



THE new Cornelia Branch open pit operation of Phelps Dodge Corp. at Ajo, Ariz., is being conducted in and around a disseminated copper deposit in quartz monzonite porphyry. Associated formations that come within the scope of present mining operations are rhyolite and fanglomerate. As a result of the wide range of drilling and blasting conditions encountered, there are two different methods in use for the drilling of large blast holes in the new Cornelia pit.

* Paper presented by David C. Minton, Jr.

Practically all blank blasts are made by drilling a single line of vertical drill holes near the crest of the bank and blasting to an open face. Standard bank heights are 33 ft in fanglomerate and 40 ft in other formations.

The quartz monzonite has been classified relatively as hard, medium and soft for comparison of drilling results. It is brittle rock and good fragmentation can be attained if proper powder factors are used. The only limit on drill hole interval is prescribed by the size of hole and the powder factor. The rhyolite is similar to the hard monzonite insofar as drilling and blasting are concerned.

The fanglomerate is the most difficult material to handle. Due to its toughness and large intersecting fractures, satisfactory fragmentation requires close hole spacing. Holes larger than six in. are of no particular benefit in blasting. For comparison of drilling results, the fanglomerate has been classified as hard and very hard.

Large churn drills, swinging 6000 lb of tools, and using 11 1/4-in. bits, are at present the most efficient rigs for drilling at Ajo if the rock is rhyolite or monzonite.

Heavy percussion drills, drilling damp, are the most efficient machines that have been tried for drilling in the fanglomerate. They are much more efficient for holes under 40 ft in depth than for deeper holes. Other applications for these drills arise from their ability to operate in a tilted position to drill an inclined hole.



The panel on trend toward larger shovels was marked by lively discussion

Primary Drilling Practice at Northwest Magnesite

By ROGER L. FISK

Superintendent of Mines
Northwest Magnesite Co.

Full text of this paper appears on pages 34 to 36 of this issue.

PANEL DISCUSSION—TREND TOWARD LARGER SHOVELS IN MINING AND EARTHMOVING

Chairman

L. F. PETT

General Manager

Utah Copper Div., Kennecott Copper Corp.

Why a Trend Toward Larger Power Shovels

By L. F. PETT

General Manager
Utah Copper Division
Kennecott Copper Corp.



SPIRALING costs of producing a pound of metal is forcing companies to abandon usable equipment. Of the six factors which are available toward solution of rising mining costs only the following should be open in this discussion.

1. Relationship between wages and skills of mine employees.

2. Probability of increasing rates of production.
3. Improvement in power shovel equipment.

Output per man shift with any specific type of equipment remains practically constant with no productivity increase due to advancing skills of operating personnel. Production per unit of ten years ago is equal to present output. Yearly variations in production effort are often associated with work interruptions. Pending strike action creates a "what's the use" attitude among employees. An attitude which isn't always erased with settlements that return men to jobs. There is no buoyance emanating from strikes that benefit either owners, employees or the public. As employees, men are entitled to benefits of better homes, automobiles and household appliances as a concern progresses. When forces which lift an enterprise into profit are able to overcome obstacles of production, consideration is due the men who run its machines.

Trimming cost by increasing daily output is not new to open cut mining. Its history is replete with today's records raising tomorrow's objectives. How large can a mine become. Potential of new production ultimates which reach beyond present records remain accessible; barring the rising barriers of a controlled economy or the silent spectre of idle equipment standing in rows.

Two decades ago when converting steam shovels to electric units, it was a pioneering adventure to determine the kind and type best suited for the job. Today, creators and builders of American machines have combined to make available an unparalleled array of good mining equipment. These machines have been designed with the operator in mind. Safety, comfort and controls have put them in the preferred class among employees. Largely through more power at the finger tips of the men who run them, these machines are still reaching upward in total work performed per machine shift. How far this trend will go is problematical. So far, safety, flexibility and simplicity of control have kept pace with output. Whenever production takes the lead, an automatic danger signal for usefulness of that equipment will appear.

While output from any given type power shovel remains fairly constant, the step from four and one-half to five-yard shovels represented a 40 percent rise in output per shovel shift.

Insufficient data is available to predict accurate advancement to be gained by larger shovels, but evidence has pointed to a comparable increase for six seven-yard machines now at the Utah copper mine. The number of

shovels in the four and one-half-yard capacity is growing less and will vanish as did the steam shovel before them to bring shovel output within the range of present builder achievement. The objectives, claims and counter-claims of the men who know their shovels best I leave to Mr. R. M. Dickey, sales manager, Large Machines, Bucyrus-Erie Co.; A. F. Busick, Jr., vice-president and chief engineer, Marion Power Shovel Co.; Robert E. Meyer, chief engineer, Large Excavator Division, Harnischfeger Corp., and N. E. MacLean, Southwestern sales manager, American Manganese Steel Division, American Brake Shoe Co.



ADRIEN F. BUSICK, JR.
Vice-President & Chief Engineer
Marion Power Shovel Co.

EVER since shovels and draglines became the accepted tools of the mining and excavating industry there has been a gradual trend toward larger and more powerful equipment. It is true that this upward trend has at times been halted temporarily but over the years it has been persistent and is still in evidence.

We will confine our comments to close-coupled shovels as used in connection with either rail or truck haulage in the stripping and extraction of ores and minerals.

The 4-cu yd loading shovel was the standard unit for heavy duty mining and excavating work in the period from 1930 to 1935.

During the next five years the 5-yd machine became the popular size and was used extensively on both new projects and equipment rehabilitation programs. It was during this period that the 10-cu yd rear dump trucks was first introduced and truck haulage appeared to have definite possibilities in the future.

In the period from 1945 to 1950 machines in the 6 and 7-yd bracket were widely used and effectively demonstrated the economies of larger equipment. Concurrently the truck industry was in a period of intensive development and 25-cu yd trucks were introduced and perfected.

Several factors appeared to be influencing the trend toward larger equipment at that time.

(1) The steadily mounting labor scale and fringe benefits had been a continual spur to the application of larger equipment everywhere.

(2) Readily available ores are being depleted rapidly and remaining deposits often lie under deeper overburden.

(3) The use of lower grade ores requires considerably greater tonnages of material to be mined per ton of finished product.

(4) With the development and perfection of larger trucks, the economies of a combination of larger shovel and haulage units became possible.

After evaluating these factors, we came to the conclusion that the upward trend in machine sizes would continue and, in order to be able to meet the demand for such equipment, we should immediately design and build a machine to the following specifications:

(1) Dipper size to be 10 cu yd for heavy duty work.

(2) Machine to be mounted on two crawlers and to have high travel speed and the same maneuverability as smaller machines.

(3) Front end to be very rugged and close-coupled with particular attention to the problems involved in securing

proper dumping of the dipper when loading trucks or cars, on grade.

(4) Electric motors and generators to be of ample size to assure high speed operation on all motions with equivalent or better cycle time than smaller machines.

(5) Machine to be designed with high reserve factor to assure continuity of operation and lower maintenance cost per ton of material moved.

In late 1951 the first shovel with these specifications was delivered to Western Contracting Corp. and in 1952 we shipped two more to them. So far this year we have shipped one machine to the Iron Range, one to the copper territory and one to another large contractor.

In addition to the need for this equipment in metal mining and large excavation projects, it appears that there will be a market for such a unit modified for use in the anthracite coal fields and also in the bituminous regions.



R. M. DICKEY
Sales Manager, Large Machines
Bucyrus-Erie Co.

THE trend toward the use of larger excavators dates back some 70 years to the time when sufficient manufacturing facilities were made available in this country to embark seriously upon the development of this type of machine. Because of demand for it, excavating equipment has increased phenomenally, especially during the past decade, and accompanying this numerical demand has been a call for increased output potential. A very pronounced trend toward the use of smaller excavators must also be pointed out. Obviously, the excavator selected for certain work should be the one best adapted to the job under consideration. The intelligent operator will analyze his prospective work in detail regardless of so-called trends.

Major emphasis is given here to the mining type of shovel well known on the Mesabi Iron Range, and specifically to those now available with 6, 8, and 10 cu yd dippers. Four items influencing costs of operation are considered. These are: (1) Interest, taxes, and insurance on the all-in cost of installation of the machine. (2) Operating labor. (3) Electric power. (4) Repairs, maintenance, and supplies.

Actual figures are used as bases, but results are expressed in percentages.

For comparison, interest, taxes, and insurance are set up on an estimated 10-year life for the machine. The average annual investment is then 55 percent of the all-in cost of installation and the charges for interest, taxes, and insurance are annually 5.5 percent of the capital charges.

The monthly labor costs are based on operating crews consisting of an operator, oiler, and an electrician.

Output estimates indicate that the 8 cu yd shovel has an output potential of 30 percent more than the 6 cu yd machine for equivalent work and the 10 cu yd shovel 60 percent more than the 6 cu yd unit. The 10 cu yd machine would have 23 percent greater output than the 8 cu yd.

Outputs are based on an over-all operating efficiency of 75 percent which is about the best that can be expected in an open pit mining operation.

When these estimated outputs are related to over-all operating cost it is found that the 8 cu yd shovel operates at a cost per yard 93 percent that of the 6, and the 10 at 90 percent that of the 8.

This indicates a lack of uniformity of unit operating

costs as related to dipper sizes and output potential, due to the influence of interest, taxes and insurance.

The two general types of shovel usage in open pit iron mining involve different approaches to machine selections.

Making iron ore grades requires output over relatively short periods of time, as well as mobility and ease of movement from place to place. Flexibility is a prime requirement.

Taking mine-run material, as at the majority of the proposed large taconite operations, to provide adequate outputs on the basis of a 75 percent over-all operating efficiency, five 8 cu yd units or six 6 cu yd machines would give, for equivalent conditions, approximately the same output as four 10 cu yd excavators.

For a given output requirement all three sizes of shovels in the multiples used would operate at essentially the same cost per cu yd. Increased output of the larger shovels is not sufficient to compensate for the greater capital charges involved in installation. The financial burden in the form of interest, taxes, and insurance for the 8 cu yd shovel is 35 percent greater than for the 6 cu yd machine, and that for the 10 cu yd shovel 87 percent greater. It is estimated that the all-in cost of five 8 yd shovels is 13 percent greater than that of six yd machines, and that of four 10 yd shovels about 9.5 percent greater than that of five 8 yd machines.

This emphasizes that the following items, extraneous to the excavators proper, must be given full weight.

(1) Availability could be carried to a ridiculous extreme, but should receive consideration.

(2) Availability of labor—Where suitable labor is difficult

to obtain, it becomes desirable to reduce the number of machinery units to a minimum.

(3) Relation of dipper opening to crusher size has been stressed in certain instances. Much more important than dipper openings would seem to be the intelligence of the shovel operator in rejecting oversize.

(4) Correlation of dipper sizes and haulage units is fundamental in shovel selection. If one particular size of shovel best fits the picture from the excavating standpoint, suitable haulage units must be furnished to service the excavator and an adequate number of these provided.

(5) Effect of impact of material dropping from the larger dippers into the haulage equipment and possible disproportionately increased maintenance.

(6) Pit layouts may be such that it is impractical to provide the larger number of working places required for the smaller shovels to give the desired output.

(7) Increasing the number of shovels leads to increases in the transport required, whether this be rail or truck.

The trend toward the use of larger excavators is of long standing and continuing. For large scale operations where mine-run material is to be handled, it would appear probable that investigation of all influences entering into the picture would point to the use of larger shovels rather than smaller, within reasonable limits. This would not necessarily result from reduced costs per unit of output as chargeable directly to the shovels but more on variety of other elements entering into the complete cost picture. Correct selection of excavator sizes must depend upon specific job analysis.



ROBERT E. MEYER*

Chief Engineer

Harnischfeger Corporation

THE definite trend to larger shovels is, no doubt, the result of the changing demands in mining conditions due to the depletion of our richer resources during the war and the necessary expedient of handling large volumes of low grade ores at economically feasible costs. Indications are that larger haulage units teamed with high capacity shovels, matched to the cubic yard capacity of the haulage units with an ideal load time of three swings per haulage unit, will be the answer to higher production and lower cost.

Just how large equipment becomes will depend on installation conditions in a great variety of mining operations. Some are limited to relatively small shovels and others are capable of using very large shovels up to 40 cu yd capacity. Also, in the case of shovels, the size will be limited by the height of the banks, the width of benches and the steepness of pit slopes. In the case of applying larger shovels in existing mines, the present condition of banks and benches is, of course, more limiting in determining maximum sizes applicable.

In spite of apparent limitations, some manufacturers of shovel and haulage equipment are recognizing the trend and have built, or are developing, larger units in answer to it. The success of these undertakings is due to several important engineering advances. In the case of shovel manufacture, the engineering development of simplified, lower cost, better performing electrical controls to handle the larger power requirements is of major importance.

* Presented by Paul H. Hunter, Harnischfeger Corp.

The development and application of new mechanical and electro-mechanical power transferring devices has made possible the smooth application of large amounts of power in order to create faster digging and swinging cycles with larger, heavier machines. Also the increased use of alloy steel and welded construction has permitted the building of larger machines with lower ratio of weight to dipper size than heretofore. In haulage equipment, the successful development and application of torque converters and higher horsepower engines has made possible the design of large size units with actually lower operating costs than the conventionally powered smaller capacity units.

In summing up, we might say that the trend to larger shovels starts with the change toward larger capacity units in mining and earth moving and is further encouraged by the ability of manufacturers to produce successful shovel and haulage units in larger sizes. The fact that the trend can be satisfied with modern high capacity equipment should strengthen the trend and usher in a new mining era of large volume handling of low grade ores and overburden at economical costs.



Big trucks and big shovels are trend of the times

GOLD, SILVER AND MONETARY PROBLEMS

Chairman
DONALD H. McLAUGHLIN

President
Homestake Mining Co.

HON. PAT McCARRAN
U. S. Senator from Nevada



DEFLATION, with its accompanying unemployment, is one of the bugaboos of the average citizen. But he also fears inflation, with its upward-spiraling prices. The man who works for a living wants stability in both the quantity and the value of his money. Neither is inherent in a paper currency, not redeemable in the monetary metals.

It is past time to take real steps toward a return to a metallic money; to let Americans have a free choice between bank deposits, paper currency, and gold and silver.

In order to bring the subject of sound money to the fore and pave the way for careful and detailed analysis, I introduced on July 29 a bill (S. 2514) to require the redemption of United States paper and subsidiary currency in either gold or silver, at the option of the holder of the currency, at prices for gold and silver to be determined by the Congress after committee investigations and consultations.

During recent years, fundamental adjustments have been worked out to give a clearer indication of the prices at which gold and silver could be sustained in exchange for paper currency. I see no insurmountable obstacles to the determination of such prices. Consideration must be given to the deterioration of the monetary unit since 1940 and also to the cost of producing new supplies of gold and silver.

It is my plan, as outlined in my bill, to have the United States Treasury announce a price at which it will buy all gold offered, and a price at which it is willing to acquire, at the full monetary value, all silver tendered to it. Redemption would also be made, at the option of the individual, in gold or silver coins of full bullion content. Under United States sponsorship, these prices would almost certainly be adopted by the International Monetary Fund.

Today, the chief difference of opinion is not between advocates of gold and those of silver, but between those who want a completely "soft" money, given value solely by the fiat of the State, and those who prefer a money redeemable in something that has value in itself.

In order to give the greatest impetus to international trade, investment, economic cooperation, and post-armistice rehabilitation, the recognized monetary metals, gold and silver, must be readily convertible into the United States dollar and the British pound sterling. Conversely, these key-currencies must be readily convertible into gold or silver. The use of silver, as well as gold, as an international reserve, would strengthen the principle that something intrinsically valuable should be held against obligations to pay nations with credit balances. It would be a

distinct reversal of the current trend toward operating without capital except that printed by some Government on a piece of paper. It would do much to direct public thinking toward personal and national solvency.

Monetary gold reserves of the United States now exceed \$22.5 billion; and monetary silver reserves, valued at \$1.29-plus per fine ounce, approximate \$3.8 billion. It is feasible for the United States to offer to acquire either metal in unlimited quantities, and at no cost to the taxpayer, provided the metal is purchased at its monetary value and is monetized after purchase.

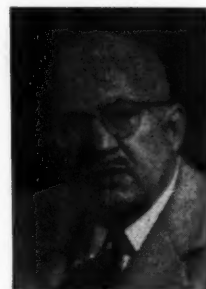
Official currency values of countries that are members of the International Monetary Fund are stated in terms of grains or grams of fine gold, and in terms of United States dollars. It is proposed to add grains or grams of fine silver to this table. Thus by mutual agreement silver could be converted into units of currency desired for international trade.

An expanding currency based on metallic reserves is to be preferred to a currency expanded at the option of a Bureaucracy which attempts to use the monetary system as a means of redistributing wealth and income.

Monetary systems generally break down during and after great wars, and little can be done for a country that, in the long run, continues to spend more than it collects in revenues. The work of rebuilding national finances is painstaking and slow; but acceptance of my proposal would be an important contribution toward financial stability. What I have proposed, in short, is a return to national solvency, from which we should not have been led astray.

Sound Money

By **MERRILL E. SHOUP**
President
The Golden Cycle Corp.



IT IS imperative that the arguments for the return to sound money be repeated again and again. It is vital to our nation and to the welfare of all the world that our nation return to the gold standard and promptly.

The paper money managers have enjoyed a blank check arrangement on John Doe Public's bank account. Under irredeemable paper currency, John Doe Public cannot stop at any time, and at his will, end government financial rampages. Under a gold coin standard and redeemable paper money, he can.

During World War II we spent \$350 billion and suffered one million casualties—all for the end purpose of helping to save France, England, Russia and China. Since World War II, we have spent, or committed ourselves to spend, to bolster foreign nations and to fight Russia and China, \$55 billion and suffered an additional 150,000 casualties. John Doe Public may well have questioned our government's mad spending, coziness with Russia, sell-out of Nationalist China, the Korean Affair, and the continued spending policies originated by men tried and found wanting. But Mr. Public could do nothing about it. He could not demand gold for his paper money. Since 1940, John Doe Public might have at times been worried by the increase in paper currency in circulation from \$8 billion to \$29 billion. He might have been worried about the increase in bank deposits from \$63 billion to \$167 billion, but again he could do nothing about it. Maybe John Doe Public is the loser under any money standard. Maybe he will lose under a gold standard. But one thing is certain, his losses under the gold standard have been negligible—

nothing, compared to his losses under irredeemable paper money management.

Speaking further about paper money managers, it is interesting to note that they apparently do not trust each other or subscribe to a super, super money manager. Paper money managers in the world today settle balances between themselves in gold. Their paper money is not acceptable.

There is something evil about any double currency standard, when that standard makes available American citizens' gold to foreigners and denies that same redeemable dollar and hard money to the citizens of this country.

The only alternative to our chaotic conditions is peaceful trade between individuals, communities, states and nations. There can be no real trade under irredeemable paper currency in which John Doe Public has no confidence. The future progress, peace and prosperity, not only in the United States but all over the world, lies in the prompt return to the gold standard, bringing with it sound money.

The Canadian Viewpoint

By **V. C. WANSBROUGH**
Vice-President and Managing
Director
Canadian Metal Mining Association



IT may sound presumptuous to speak of the Canadian viewpoint on a topic so complex, controversial and fertile in differences of opinion. But we have some justification for speaking of the Canadian viewpoint. For some time past the Canadian gold mining industry has been able to present to the Canadian Government a gold program and a gold policy on which all are agreed.

This is the Canadian gold program.

We reaffirm our belief that an increase in the official price of gold is necessary.

We respectfully urge the Government of Canada to exercise its influence towards obtaining such increase in the official price of gold and actively associate itself with other governments in pressing for this objective.

The International Monetary Fund has decided that there should be no increase in the official price of gold for the present. It is therefore recommended that the Government of Canada initiate action along the following lines:

- (1) The marketing of fine gold should be permitted and encouraged by the following means:
 - (a) producers electing to sell on the premium markets should be allowed to sell fine gold, and
 - (b) fine gold should be minted in Canada for general purchase and sale in forms suitable to the market, the price to be freely determined between buyer and seller.
- (2) Foreign purchasers of newly mined Canadian gold and foreign holders of gold who wish to store it in Canada for safekeeping should receive assurance that they will be permitted to export such gold as and when they desire.
- (3) For mines which are, and elect to continue, in receipt of cost-aid assistance, the amount of assistance should be increased and thereby be made more adequate to the current crisis in the industry.

You will note that we do not suggest a return to the full gold coin standard. The reason for this is not that we don't believe in it, but because we doubt very much if it is practical politics now. Nor can we expect one country to "go it alone" in this respect.

A return to the gold coin standard is usually advocated

on the ground that it will transfer control of the money supply and credit back from public servants to the public at large. It will protect governments against constant temptation to inflate. It will ensure sound money and the honest dollar through direct public control. Now this is not a line of argument that governments seem to agree with or relish. The very human persons who constitute our governments do not seem to like to have their integrity and competence questioned and impugned. If they did concur, they would, in effect, be confessing that they share in all these dire suspicions of their own honesty and ability.

For this and other reasons it is our belief that the time is not seasonable for urging a return to the full gold coin standard. But that is no reason why private citizens should not purchase and own gold if they want to. We urge, then, the right of private purchase and ownership of gold in such forms as people may desire to have it.

ROBERT P. DAY
President
Cordillera Corporation



WE ARE told repeatedly by pseudo-economists that any rise in the price of gold is inflationary.

What is Inflation? The Merriam-Webster dictionary says: Inflation is "disproportionate and relatively sharp and sudden increase in the quantity of money or credit, or both, relative to the amount of exchange business. Inflation always produces a rise in the price level."

What does Webster say about Reflation?: "To expand again the quantity of currency and credit after a period of deflation." For instance: Gold has gone through a long 20-year period of deflation, resulting from its arbitrary valorization at \$35 an ounce, while costs of production have soared.

Please note in the definition of inflation the words "increase in the quantity of money or credit." We who are asking a higher price on gold are not proposing any increase in the quantity of money or credit. We are proposing an increase in the amount of gold-value behind each dollar and a general increase in gold reserves.

Raising the price to evaluate gold fairly is not inflationary! It is reflationary, which is vastly different! It is, in fact, a safe means of controlling a normal expansion of the currency which becomes imperative from time to time in our economic system. Far from being inflationary, it is the safest kind of safeguard against runaway printing press inflation! For gold is a scarce commodity with a scarcity value, and its supply can not be arbitrarily and capriciously increased sharply.

Returning to Webster: "Inflation," he says "always produces a rise in the price level." In 1934 when the price of gold was raised from \$20 to \$35 an ounce, prices did not budge! Nothing in the whole economic system showed any of the characteristics of inflation. Why? Because it was not inflationary!

Still another "big falsehood" which has been repeated so often in recent years that many have come to believe it true, is that U. S. Gold reserves represent a gold hoard of enormous size, and that there is today ample gold in U. S. Reserves and in the world, to set up and operate the world money system. Nothing could be further from the truth.

Did you know that today, with our present gold reserves, there is only a possible 11 cents worth of gold behind the

American dollar? How can we rationally consider a Gold Standard and convertibility, with only 11 cents worth of gold behind each American dollar? There are very inadequate gold reserves, even in our own country, and frightfully inadequate gold reserves in every other nation of the free world.

By raising the price to evaluate gold fairly, we shall stimulate gold production and thus eventually bring gold reserves up to a point where it may be safe to have a Gold Standard with convertibility.



O. H. SOLIBAKKE

Director

Cariboo Gold Quartz Mining Co., Ltd.

MAN will go farther, suffer more and strive harder to acquire gold than anything else in the world. Some people say, either through ignorance or for some ulterior motive, "Gold is outmoded." GOLD today is the potent instrument for either good or evil—it has always been throughout the centuries. Countries without gold are economically prostrate. The country with gold dominates its own economy as well as that of the world. How it handles the responsibility of that position will determine its right and responsibility to dominate the rest of the world. The United States of America is in that position at the present time. It is a great responsibility and it cannot be waved aside and ignored.

Throughout history there has been a periodic recurrence of wars, false money and reforms. In biblical times there was a succession of seven fat years and seven lean years. The peoples of those countries learned to store up grain and gold during the seven fat years so they could survive the lean years.

Well, President Roosevelt took over the responsibility of running this country during a period when the economy was in a lean period. What to do became the question. Mr. Eccles came up with an answer which it appeared would solve the problem. At any rate, the President accepted it. This was to take gold backing off our currency. There is a total of \$11,400,000 worth of foreign owned gold stored in the United States for safe keeping. At the same time it is illegal for our citizens to own gold in the United States.

Since 1934 the printing presses have been reeling off millions and millions of paper dollars. This paper becomes valuable as you and I trade it for farm produce, manufactured goods, a house, a farm, or a day's labor. Today the dollar is worth about 50 cents or less, in terms of purchasing power compared with the dollar we used to have when it had a gold backing. The cost of producing gold has doubled, or rather, we are suffering under the handicap of a 100 percent inflation.

In Canada, the second largest producer of gold in the world, they "bonus" their gold mines to keep the industry alive because they know what the gold mining industry did for their economy during the last depression. They are wise enough not to let the gold mines die for they will need them again.

When the gold backing of our currency was removed and the printing presses started to reel reams of paper dollars backed only by the Government's ability to tax, we started on the road that heads for trouble. This is not the first time this false method of creating prosperity has

been tried, and has failed. Due to the decline in the purchasing power of our dollar, labor has year after year asked for higher pay. What difference does it make if a wage earner is paid \$5 a day and it costs \$5 to live, or, if he or she is paid \$15 a day and it costs \$15 a day to pay for his needs? None at all. When the dollar had the "policeman" gold removed, all restraint "went out the window."

There is no easy way to solve the problems facing us in the future, but, the one most likely to succeed is that of stabilizing the United States and Canadian dollar on a base of gold with the pound sterling countries. This would not alter the value of the American dollar in terms of foreign trade.

Our fake prosperity is tapering off and the gold mining industry which has experienced at least ten years of depression will again take its place and be treated with the respect it deserves.

NONMETALLIC MINERALS

Chairmen

DRURY A. PIFER

Director

School of Mineral Engineering, University of Washington

SHELDON L. GLOVER

Supervisor

Washington State Div. of Mines and Geology

Merchandizing Non-Metallic Products

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IT IS not difficult to understand the general apathy which exists among technical men when the word "sales" is mentioned. Until my original exposure to administrative responsibilities I had always assumed that if a product was properly formulated and produced, the problem was solved. It should have occurred to me, as I know it does to you, that I had overlooked the third leg to the three-legged stool. I would not wish to infer that the sales leg is the most important or the longest or the strongest. It must retain proper balance with the other two if the stool is to be a solid and useful object. When I realize more each day that it requires money to carry out adequate research and development, that it requires additional funds to produce efficiently and properly, then the old saying, "a sale is made only when the cash is in the till," becomes a business proverb that should be more fully understood and appreciated.

Webster defines the verb "merchandize" as, "to seek the further sales or use of merchandise or services by attractive presentation and publicity." There may have been a time when a manufacturer or producer could market his product by attractive presentation and proper publicity and without too much consideration for the customer or how he used the product. Without even basic knowledge of the marketing problems of products in industries other than my own, Webster's definition has overlooked the most important partner to the sales transaction—the customer.

May I, therefore, humbly seek to supplement Mr. Webster's definition by the addition of but three simple words at the end of his sentence—"and customer service."

In any product offered for customer acceptance, the customer does not actually buy the product. He purchases the service that the product will give him. Does the Coca-Cola Company sell a dark-colored, carbonated pop containing caffeine? No, it sells refreshment. Does Lifebuoy sell soap? No, it sells a newly scented treatment to cleanliness. Does General Motors sell automobiles? No, they sell transportation.

Is there such a startling difference then in the merchandizing of non-metallic products as compared to others more commonly offered to the general public. In my opinion, there is not. Except that in merchandizing our products we must be able to sell and deliver industrial service generally as compared to personal service.

Using ceramic products as an illustration—have you ever seen a piece of vitrified clay sewer pipe? It is aesthetically a homely product. To the architect, engineer or home builder interested in a trouble-free sewage system it would not be too helpful to know that we had advertised our product on the radio, television and in the *Saturday Evening Post* and packaged it in a plush-lined container. What he would wish to be assured of is a pipe that would never wear out, would resist root penetration, reduce ground water infiltration to an absolute minimum—or in other words, secure a permanent sewage system which he or his client could forget once installed, and in addition we should make this product so available to him that it is easy to buy and can be obtained at the time and place he wants it. Here we are merchandizing—not pipe—but sanitation and health for a deserving public.

Not all products in the non-metallic field are devoid of beauty. The production of Franciscan Earthenware and Franciscan Fine China has been a source of pleasure and

profit to our company. There can be no question as to the importance of attractive presentation and publicity for a product of this type, nor may we overlook the customer service requirement. We do not market dinnerware or dishes. We propose to provide for the customer a beautiful table setting which denotes hospitality and at the same time build into that tableware the qualities of long usage in the sanitary serving of food. Beauty of color, artistic design, perfection in contour and glaze, attractive presentation and renown of the maker are all important to the customer, but none as important as the service he will obtain once he has decided to buy.

A firebrick is another non-metallic product lacking in aesthetic qualities, but represents one of the few true basic industries. Is the potential purchaser of refractories interested in an attractive presentation or the publicized identity of the brand or manufacturer? To a degree he is. But more important by far are the questions—"How many heats can I obtain per ladle lining? How many campaigns per lining in my open hearth? How long will my boiler operate without refractory replacements? What is going to be my furnace maintenance costs? Will the manufacturer recommend the proper type of refractory at lowest cost to me? Can I obtain delivery when I want it, and can I obtain additional small quantities or specials if I need them?" These questions again resolve themselves into customer service, a factor more important in the refractory line of products we produce than any other.

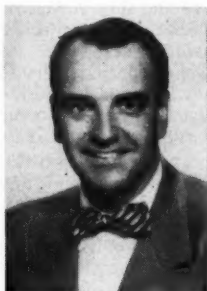
Let us all admit, as we must, that the day of the tough selling job is just ahead, or perhaps already here. The degree of success we enjoy as business enterprises will in a great measure depend upon our ability to serve our customers better. The merchandizing policy for the non-metallics industry could therefore be designed toward knowing the customer's needs, anticipating his requirements and being there first with the soundest presentation and the ability to deliver in accordance with our claims.

Economic Problems of The Non-metallic Industry

By RAY STAFFORD

Technician

Southern California Minerals Co.



BECAUSE of the broad aspect of the subject, these remarks are confined to the nonmetallic field of talc and clay.

After a brief history showing the cause of some of the present problems in their industry he briefly discusses the percentage depletion allowance act as it affects the progress of operators today. Then several phases such as locating, developing, mining, milling, selling and shipping talc and clay are touched upon, bringing out problems faced by the industry and what has been done about them.

Compensation insurance in California and some attendant gripes are brought out, along with a plan one insurance carrier offers as relief.

The difficulties encountered in the installation of a modern grinding plant in a metropolitan area are related, as well as rugged experiences encountered in opening Montana Talc properties in the winter time.

Very briefly sales methods and shipping problems are discussed and the basic differences of problems between clay and talc mentioned.

The paper ends with the remark that the nonmetallic field of talc and clay can be profitable providing that ample experience, training, willingness to work and natural ability are present in all divisions of the operation.

Energy Sources for the Northwest

By JOSEPH DANIELS

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WASHINGTON possesses the largest resource of coal among the Pacific Coast States. Estimates based on a survey made by the U. S. Geological Survey in 1926 credited the State with 11 billion tons of bituminous, 52 billion tons of subbituminous and 23 million tons of anthracite and semianthracite. It is now known that some of the subbituminous areas should probably be classed as lignite. Production reported since 1880 amounts to approximately 145 million tons; depletion is estimated at 290 million tons; and recoverable reserves, based on 50-percent recovery, nearly 32 billion tons.

The commercial coal, mainly of Eocene age, lies along the western flank of the Cascade Mountains from the British Columbia border to the Columbia River in western Washington, and on the east flank in central Washington. Both areas are served by transcontinental and tributary railroads, excellent highways provide access to local markets, and close proximity to tidewater points makes it possible to ship coal to the Pacific Rim.

Every rank of coal from lignite to anthracite is present; the diversity in rank is due to the influence of dynamo-metamorphism which has resulted in the formation of higher rank material than normally would be expected

from Tertiary deposits. Except for higher inherent ash content the coals conform to those of similar rank found elsewhere. Sulphur is low, 0.5 to 0.6 percent, phosphorus generally 0.05 to 0.10, ash-softening temperatures range from 2200 to 2800° F. The bituminous coals are of free-burning and of coking grades.

In the years that have elapsed since coal mining began in 1852, the product of Washington mines has entered every field of utilization—household heating, steam generation, locomotive and steamship fuel, copper smelting, magnesite burning, cement manufacture, ceramic firing, manufacture of coal, producer, and water gas and other applications. Coke made from Washington coals has been used in metallurgical plants, in foundries, water gas making, sugar refining, and as domestic fuel. Experimental work

has indicated that the coal has value in low-temperature carbonization, production of oil and motor fuels, and for synthesis gases. Beehive and byproduct coke totalling 2,340,411 tons were produced from 1880 to 1946.

The industry has suffered from the ills of substitution and competition with hydroelectric power, imports of petroleum and its products, local wood fuel and shipments of coal from nearby states and provinces. A proposed natural gas supply may be expected to intensify the rivalry between the many sources of energy now available. The present over-all fuel and energy situation will change, but coal remains as the greatest reserve for future sources of energy and indispensable sources of carbon and hydrocarbon. It is reasonable to expect that a growing Northwest will some day utilize its coal reserves in the expected development of its varied resources and potentialities.

Research in the Ceramic Industry

By **W. O. BRANDT**
Director of Research
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THIS paper discusses briefly the factors of economics, material depletion, and product use which have brought about great changes in the ceramic industry within relatively recent years. These have caused greatly increased research efforts on improved raw materials, more efficient processes, and improved products.

Detailed discussions of the changes in the whitewares, building products, and refractories industries indicate the major fields of development are as follows:

Whitewares: Improved raw materials, mechanization of processes and improvement of design.

Building Products: New methods of use and reduction in installation costs.

Refractories: Beneficiation of raw materials and improved products.

As a whole, the ceramic industry has been changing from its old status as a backward, inefficient, low profit business to a new and modern type of operation combining highly technical mechanical and chemical techniques for production of improved products at lower costs.

Ceramic Industry of The Pacific Northwest

By **HAL J. KELLY**
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THE ceramic industry of the four-State region, Oregon, Washington, Idaho and Montana, consists of manufacture of structural clay products and refractories. There are 36 structural and five refractory plants in the four States and their average annual production is in excess of 400

thousand tons of ware. Two companies operate four of the refractory plants and the other is a captive operation in Montana that makes brick for use in their own smelter.

The structural clay products plants are concentrated in the coastal areas of Oregon and Washington where population is highest. Over the past 30 years the number of such plants has been decreasing, and within the past five years six plants have ceased operation and only two new ones have started. This decrease was due to improved roads and transportation, and to increased labor costs. The more efficient use of labor in the larger plants and truck haulage permitted the competitive invasion of the smaller plant's market area. The hand labor requirement, characteristic of structural clay products manufacture, militates against the smaller plants, especially during periods of rising labor costs.

The present trend of increasing transportation costs, however, limits the markets of the larger plants and many of the local plants are facing competition from Midwestern producers. Four plants in Montana now are using natural gas and they report fuel costs of \$1.50 to \$3 per 1000 brick. This can be compared to \$4.50 to \$10 per 1000 for plants using other fuels. The comparative ease of firing and reduction in supervision during the burning are factors not included in the above figures for fuel costs, nor is the exact price of natural gas known for Oregon and Washington, when available.

The rapid expansion of heavy industries in the Pacific Coast area during and since World War II has increased the demand for refractories of all types. Notable post-war developments are the contemplated installation of three oil refineries in Washington, one of which has started construction, and the new nickel-smelting plant in Oregon, and continued expansion of the aluminum industry.

The extensive development of hydro-electric power in the four-State region has created a large and growing market for electrical porcelain. An estimated \$2.5 million market for high-tension insulators now exists that is being supplied by Eastern and Midwestern manufacturers, and some Japanese have recently entered the market area.

The trend toward higher grade refractories for many uses formerly supplied by lower grade brick, and the rigid quality requirements for raw materials if used locally in making electrical porcelains will necessitate exploration and development of the highest grades of clay, silica, feldspar and sillimanite-group minerals. The latter two minerals are known to exist in the region but lack of market has retarded their development or proper evaluation. The ceramic resources of the region, especially those of Idaho and Montana are largely unknown. This has been due to comparative absence of industrial development.

The Pacific Northwest offers a frontier for ceramic industrial expansion but to fully capitalize on the opportunity, exploration and evaluation of raw-material resources must be extended with emphasis on deposits of the highest quality.

DEVELOPMENTS IN PROSPECTING

Chairman
PHILIP J. SHENON
Director
Day Mines, Inc.

Use of Geology in Ore Delineation and Extraction

By **ROBERT E. SORENSON**
Vice-President
Hecla Mining Co.



THE role of geology in exploration, development and ore extraction is becoming more important in mining operations because of depletion of known ore deposits and the increasing problems attending discovery of new ore bodies. Every tool at the command of mining geologists should be used in planning complete ore extraction.

The controls and records in vogue in the Star mine at Burke, Idaho, will be described because the solution of Star mine problems may be helpful to others faced with similar problems.

Muck sampling of all of each stope's production provides a dollar value of each month's production which is compared to complete individual stope cost records throughout the life of the stope. Poor stope performance may be quickly corrected and the information gives a "cut-off grade" for each stope.

To expedite determination of the dollar net smelter return value of any combination of lead-zinc assays and any combination of metal prices, the engineering department has calculated data expressed on a pair of charts. These charts are believed to be novel, are known to be effective and account for several variables.

Geology is compiled on 100-scale plans and 100-scale cross-sections, the latter spaced at 100-ft intervals allowing complete three dimensional treatment of geological problems. Annually, or oftener if necessary, maps of each level showing proposed development plans together with a memorandum covering each level is submitted to the operators.

Ore reserves are calculated annually from drift, raise and stope sample data. A complete summary of all ore blocks is included showing three categories of ore reserves and all ore blocks are shown on 200-scale longitudinal sections. These data serve the manager and superintendent in broader phases of extraction problems.

Geologists map all drift advances and sample drifts and raises at close intervals to provide information for determination of ore reserves and operating methods. Faces are sampled in sections so that combinations of any desired differing sections may be combined for calculation purposes.

Related sections of the mine are shown on 6 by 9 in. 50-scale stope sections for use of the Manager and Superintendent in planning raise development and extraction of the indicated ore blocks. The sheets are revised rapidly and submitted promptly together with recommendations

when changes in metal price structure require changes in doubtful stopes.

Geologists map stope floors on 30-scale showing geology and samples and are thus able to obtain between-level data for cross-sections and to serve as a guide in clean stoping of succeeding floors.

Water Testing in Geochemical Prospecting*

By **H. V. WARREN**
and
DR. R. E. DELAVALT
Department of Geology
University of British Columbia



R. E. Delavault

THE target represented by a mineral deposit is widened by a genetic halo and a dispersion halo. Both push out, along the watershed, a train of dispersion, which is the farthest detectable part of this deposit. In a very rugged area, the streams should be explored anyhow, because they represent the best paths of advance in the summer, and when there is glacial drift, they offer the best available view of the rocks.

Old-time prospectors made good use of the float, and it is still very useful, but it shows very little when the mineralized area is not intersected by a stream of some importance. Besides it can be seen only in some favorable places when travelling along main rivers or trails. On the other hand, metals dissolved in water can seep for quite a distance to reach a stream, are carried along with ease and can be detected at any point of the stream until they become too diluted. It is true that they can also disappear by absorption, for instance when the stream spreads in a muskeg, but it is rather rare.

Practically, creeks which are too small to carry a canoe will exhibit metal contents if they cross mineralization of some importance. Just by exhaustive testing along his way, a water-borne prospector has the greatest probability of being led towards any large mineralization within reach. This gives to water testing a great practical importance in regions where only widely spaced geological exploration has ever been conducted, along the few acceptable trails, and where more detailed reconnaissance work would meet nearly insuperable difficulties and present a prohibitive cost on any large area.

First investigations, conducted by Thorolf Vogt in Norway, showed that metal contents of water flowing from mineralization were quite small measured in milligrams per ton; he determined them by a very delicate technique, which had to be operated from a central testing field laboratory. Sergeev in Russia and later L. Huff in the United States developed field methods, using diphenylthiocarbazone (dithizone) which were still very delicate at the small concentrations which are met in most northern or mountainous regions. They gave us poor results in the Pacific Northwest, and we had to develop a more sensitive test. It happens that it is much easier for the untrained man and works faster. All there is to do is to fill a beaker with the water, add in succession three reagents, one only being measured accurately by counting drops, and waiting one or two minutes for the color developed in the reaction to be collected by droplets of xylene, which separate like oil at the upper surface of the water. Using a specially made kit, a determination of copper and zinc in water can be made in less than four minutes, including unpacking and repacking of the implements. Many other metals, specially

* Presented by Dr. Delavault.

cobalt and nickel, can give the same reaction, but zinc remains the best pathfinder to mineralization, even if present only in very small proportions. Large amounts of iron destroy the reagent, but they are themselves indicators of mineralization nearly always.

In practice, when a metal-bearing creek is found, the prospector should work his way upstream, testing every tributary and frequently retesting the main creek, in order to localize the origin of any metal present in the water. Eventually these tributaries should be explored too. Finally the origin is reached; it well may be buried under sediment and further work, through trenching or plant sampling, is necessary for more accurate localization.



Radiometric Prospecting

By **R. M. MOXHAM**
Geologist, Geophysics Branch
U. S. Geological Survey

THE comprehensive program in the search for radioactive materials, which the U. S. Geological Survey is conducting on behalf of the Division of Raw Materials of the U. S. Atomic Energy Commission, involves prospecting for uranium by methods using a variety of surface, subsurface and airborne measurements of radioactivity. Continuing development of new instruments and techniques and also modification of instruments available from commercial and laboratory sources have been necessary to meet the requirements of the field geologist. Principal emphasis has been placed on the development of equipment and techniques for rapid field measurements of radioactivity, chiefly hand-portable survey meters, carbene equipment, gamma-ray logging equipment and airborne equipment.

Perhaps the most significant aspect of the recent development of prospecting instruments and techniques has been the marked increase in the use of scintillation detectors and their application to field measurements of radioactivity. In prospecting, where small, low-grade materials are involved, the increased efficiency of measurement is a significant factor in increasing the rate at which a radioactivity survey can be accomplished.

Several carbene installations of scintillation detection equipment are being used where rapid, low-cost reconnaissance surveys of large areas for anomalously high radioactivity are desirable. A graphic recorder, linked to the speedometer drive, provides a continuous and permanent record of the radiation intensity along the roads traversed. The carbene units have proved particularly useful in exploring wide areas around known ore deposits and in obtaining radioactivity data on a regional scale for the purpose of appraising the geological favorability of a particular area.

Our gamma-ray logging studies are primarily intended to provide estimates of grade and thickness of ore-bearing materials penetrated by small-diameter drill holes. Truck-mounted logging units have a depth capacity of 2000 ft, and are capable of logging 20,000 ft per month. Approximately 1,200,000 ft of drill hole has been logged to date on the Colorado Plateau.

An empirical calibration of the gamma-ray logging equipment has been accomplished by logging simulated drill holes of known geometry containing known grades of ore. The ore zone grade and thickness estimates made from the gamma-ray logging data are consistently high

by a factor of about 1.5 percent when compared with chemical analyses of core samples of the ore zone. However, by taking this factor into account, the grade and thickness estimates made possible by the gamma-ray logging technique are of sufficient accuracy, from a practical standpoint, to guide further exploration where core recovery is poor or lacking.

An extensive program of airborne radioactivity surveying is being undertaken to meet the need for rapid, low-cost reconnaissance surveys of large, geologically favorable areas. A multi-engined Douglas DC-3 airplane, equipped with scintillation equipment designed by the Health Physics Division of the Oak Ridge National Laboratory, is presently in operation; a second Douglas, similarly equipped, is undergoing tests prior to being put in service. A light, single-engined aircraft, equipped with a less elaborate scintillation detector, is being used for reconnaissance surveys in Alaska. The heavy aircraft are particularly suited to relatively precise grid surveys of large areas, whereas the light aircraft are useful chiefly for low-level, more detailed surveys in small areas known to contain uranium minerals.

The heavy aircraft surveys made in the past years have averaged about 20,000 useful traverse miles per year. A total of 68,000 traverse miles has been flown in 16 States since the inception of the airborne surveying program. New occurrences of uranium minerals have been found in several areas in Wyoming and Arizona; uraniferous phosphate deposits have been located in Florida; and radioactive beach sand deposits have been detected along the Atlantic and Gulf Coast beaches.

In addition to the more obvious applications of radiation detection equipment in prospecting for uranium deposits, techniques are being devised to increase the usefulness of radioactivity measurements as a geologic tool. It has been shown that in some environments, structural features and sedimentary and igneous facies and formation changes, although not otherwise obvious, can be mapped by radioactivity surveys.

Basic research relating to gamma-ray scattering and absorption and isotope geology is being carried out by the Geological Survey. The results of these studies should contribute much to our basic understanding of gamma-ray phenomena in nature and in turn will be of substantial benefit in improving our present techniques of prospecting by radioactivity methods.



Color Air Photography in Ore Search

By **PHILIP A. LAYLANDER**
Geologist
Aerogeological Exploration

ONE of the new methods in ore search is the use of large scale vertical stereoscopic color air photography. A study of dozens of large and small mining districts, including most of the important ones in the Western U. S., during the past six years has shown that there is an important class of information provided only by the color air photographs.

That type of information is the graphic three dimensional presentation of the finer details of the tones, textures and patterns of the structure—alteration—ore relationships. Much information concerning the types and grades of hydrothermal alteration aureoles is seen only with considerable difficulty by painstaking ground study. The color photographs allow rapid observation of large

areas at one time with best lighting and perspective. A characteristic of the color photographs is a much greater sensitivity to certain slight but important changes in color and tone of the altered rocks, necessary in perceiving zonal relationships and predicting ore loci. A much finer structural picture is presented by stereoscopic study of the color photographs than by ground study in most instances. The color photographs are also quite superior to black and white photographs for such studies.

It is believed that the much more rapid and improved observations possible with the use of the color photography will provide important regional and district geologic information leading to the discovery of important hidden ore deposits. Considerable experience in study of photographs of many areas is essential for evaluating the photographic information. Perhaps eventually curricula will be made available on graduate university level for such training and studies.

The study of areas with aid of color photographs often

indicates directly ore situations to the point where mining or drilling for ore is indicated. However, to an increasing extent such photogeologic studies of areas of from 20 to 100 sq mi or more will be used for selecting specific target areas of one sq mi or less where more expensive detailed geochemical and geophysical studies can best be carried out. Such photogeologic studies can be made for about \$50 per sq mi, while geochemical and geophysical studies generally run from 10 to 100 times that rate. Such costs are nominal where they result in discovery of \$20,000,000 or larger ore body, or even much smaller one if it is fairly high grade.

It cannot be overemphasized that as much knowledge as possible concerning the structure—alteration—ore habit in a region—which can only be obtained by study of several key areas—is prime requisite for analysis and evaluation of one particular area, especially one in which the mode of occurrence of the ore has not been determined. Most of the important ore deposits of the future will of necessity be found in such new areas.

ADVANCES IN MILLING & METALLURGY

Chairman

MAX W. BOWEN

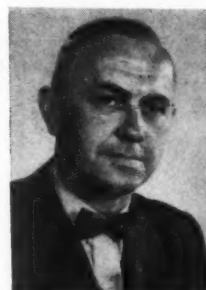
Vice-President

The Golden Cycle Corp.

Some Aspects of Alkaline Pressure Leaching Processes

By **F. A. FORWARD**

Metallurgical Engineer
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FluoSolids Roasting at The New Carlton Mill

By **T. B. COUNSELMAN**

Manager, FluoSolids Sales
The Dorr Company



WHEN Golden Cycle Corporation had their mill at Colorado Springs, they hauled the ore from the Cripple Creek District to the mill by railroad, roasted the crude ore in Edwards Roasters to drive off the tellurium, then ground and cyanided the crude ore. When they decided to move the mill to the District, many innovations were introduced. The flowsheet was changed to a bulk flotation, with roasting and cyaniding of the concentrate. Flotation tailing was cyanided in the presence of activated carbon which absorbed the gold out of solution, making thickeners unnecessary.

This paper deals with the FluoSolids roasting of the bulk flotation concentrate, a procedure which had previously been demonstrated on a commercial scale on arsenical gold ores at three plants in Canada. The flexibility and ease of operation of FluoSolids are stressed. Particular emphasis is given to the recovery of dust from the gases leaving the Reactor.

Two of the outstanding features of the FluoSolids System are the slurry feed system, with feed to the Reactor pumped in at a controlled rate at about 80 percent solids, and the ability to operate intermittently, one or two shifts a day, without difficulty or delay. The roasting is auto-genous if the sulphur content of the concentrate is kept above 20 percent. Cyanidation results of the calcine are excellent, better than the target figures.

LEACHING processes have long been used successfully to extract and recover metals from ores. Many, such as the cyanide process, zinc leaching, and copper leaching have stood the test of time—others have been tried and abandoned. Essentially if suitable selective solvents can be found and the soluble metals can be recovered from the leach solutions and particularly if the solvent can be recycled to treat a subsequent lot of ore, leaching operations have the advantage. Solutions and pulps can be easily handled and controlled, the dust problem is eliminated, and large tonnages can be handled by a small labor force thus providing a basis for low treatment costs.

In the past the majority of leaching operations have been carried out at atmospheric pressure thus limiting their usefulness as no advantage could be taken of chemical reactions above the boiling point, nor could volatile leaching agents be easily handled. Also, the solubility of gases such as oxygen and hydrogen is so low at boiling temperatures under atmospheric pressure that operations involving dissolved gases could not be carried out efficiently.

The use of autoclaves permits increasing both temperature and gas pressure in aqueous solutions and thus provides many new opportunities for utilizing high temperature reactions. Laboratory and pilot plant studies have proven the feasibility of two processes in which alkaline solvents are used.

The first is an ammonia leaching process which is designed to extract nickel, copper, cobalt and sulphur from sulphide concentrates and which will be used in the Sherritt-Gordon nickel refinery now under construction at Fort Saskatchewan. In the pilot plant operations, the nickel-copper-cobalt sulphide is agitated with ammonia, water and compressed air in continuous autoclaves. The nickel, cobalt and copper along with most of the sulphur go into solution, iron and silica are discarded as an insoluble residue. The copper is removed from the solution by boiling, while nickel and cobalt are successively separated and precipitated as metals by hydrogen at high pressure in a second set of autoclaves. The ammonia and sulphur combine to form ammonium sulphate which is recovered

as a marketable fertilizer by evaporation. The various operations are controlled automatically, labor requirement is low, high purity products are recovered, and the operating cost is expected to be considerably lower than that encountered when using conventional smelting and electrolytic methods.

Quite a different process chemically, yet similar in many respects is that developed in the laboratory for treating uranium ores by an alkaline pressure leach. In this process the ore containing uranium as pitchblende, and which has also a high content of limestone, is ground, mixed with sodium carbonate solution and charged to continuous autoclaves operating with compressed air at about 100 psi. The pitchblende, oxidized by air, is dissolved while silica, limestone, iron and other gangue materials are discarded. The uranium solution is placed in a second series of autoclaves operating under hydrogen pressure with a small amount of nickel catalyst. The uranium is rapidly precipitated as uranium oxide of purity meeting the market specifications for a refined product. The sodium carbonate solution is not affected by the precipitation and is recycled to treat a subsequent lot of ore.

The two examples illustrate the feasibility of pressure alkaline leaching processes and suggest the avenues that may be opened once the boundaries of boiling point and atmospheric pressure are passed.



New Developments in Milling and Leaching

By **DONALD W. MCGLASHAN**
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CONCURRENT with the development of new mining enterprises and the expansion of older ones, new ore milling facilities are being constructed, put into operation or are in the pilot plant stage of development. Scientific and engineering research has yielded results now being translated into plants with capacities in hundreds of thousands of tons of concentrate produced per year. In some instances, existing milling and leaching plants are being redesigned to achieve greater efficiency and capacity. New plants are being constructed and operated to mill ore not previously considered economic. This has required remodeling and modification of milling and leaching facilities and the development of new processes. The demand for greater productivity from mines already being worked requires mass methods of materials handling. Then, too, industrial demand for considerable quantities of metals such as titanium, zirconium and cobalt reflects on milling and has resulted in the construction of the new milling plants and the development of new processes in which leaching is one of the major steps.

While the size and capacity of some of the milling plants being designed, constructed or put into operation are startling, most of the milling methods applied are not new. Rather it is the careful design and lay-out of equipment with recognition of its limitations and application in the circuit for greatest effectiveness and economy. Rod mills are replacing fine crushers, and not only do they increase capacities but they clear away the usual clutter of fine crushing devices, streamlining the flowsheet. Several extremely large ball mills have been installed. Because of limits in rail transportation, these mills may have reached maximum diameter. Also, ball mills are being operated at higher speeds. Apparently these innovations

in the use of rod and ball mills are effective process-wise and in reduced installation and maintenance costs.

Cyclone separators are used in grinding-classification circuits. Perhaps this is another indication of the need for more effective classifiers. The hydros oscillator is thought by some to be an improvement in classification.

More installations of heavy media separators suggest the usefulness of gravity separation to concentrate, sort and handle materials rapidly and in large volumes. The use of jigs as supplementary concentrators to heavy media units is another illustration of adaptable thinking on the part of plant designers.

Flotation circuits have been modified to yield products of greater value and for better over-all recovery. Application, for the concentration of certain iron ores by flotation, has reached the stage where large plants are contemplated. Flotation to recover metal in the final step of a leaching operation has proved to be most satisfactory. Several reagents for more positive flocculation have been placed on the market. For flocculation of manganese concentrates these reagents have proved most effective.

A new pressure filter having an extremely short cycle has been developed and gives promise of reducing operational time and costs.

Engineering research in milling and leaching extends from the manufacturer of equipment and the laboratory testing of ores to the construction and daily operation and maintenance. Basic research in grinding, flotation and chemical processing promises answers to problems in the practical application and to better theoretical understanding of these processes.

URANIUM

Chairman
T. O. EVANS
Chief Mining Engineer
Atchison, Topeka & Santa Fe Railway Co.

Background of Domestic Uranium Production

By **BLAIR BURWELL**
President
Minerals Engineering Co.



UNTIL recently uranium has been a Cinderella-type metal, its worth and its use unknown for 40 years, and deriving its interest mainly from its association with radium and vanadium.

American resources have principally been found in the Colorado Plateau where they had been prospected and mined for about 45 years. The production history has been one of alternate extensive development and of virtual abandonment which could not be attributed to the exhaustion of its mines.

When the Curies announced the discovery of radium in 1898 two things happened:

First, scientists all over the world started probing into the nature of the atom. This led to the discovery of atomic energy about 1939.

The second was an intense, world-wide search for radium-bearing ores of uranium which resulted by 1930 in the discovery and opening up of practically all of the major sources of uranium which have supplied the Atomic Energy Program of the past 11 years.

Between 1930 and 1939 practically all mining for radium ores ceased and the mines of Eldorado in Canada and the Shinkolobwe in Africa were shut down and virtually abandoned along with the operations on the Colorado Plateau.

As uranium itself had little or no value in this period the economic interest of these sources was based solely on co-product radium, or by-product vanadium, silver or precious metals.

This was particularly true of our Colorado Plateau ores which differ fundamentally from the other world resources of the pitchblende or uraninite family. Most Colorado Plateau ores contain important amounts of both uranium and vanadium. Alternately one or the other of these has controlled the economy of the region and its development. Full utilization of both metals at the same time was only accomplished in World War II.

Up to 1923 this region led the World in radium and uranium production. It was closed down from 1923 to 1935 due to a radium cartel agreement with the Belgians in Africa, although the region could have profitably produced vanadium from large reserves of ore. Between 1935 and the start of the bomb job, the Colorado Plateau was the only major source of uranium ores actively producing that metal.

Up to 1944, operations based on the production of vanadium as the principal product had increased the output of the Colorado Plateau to the point where it was the leading World producer of vanadium. The uranium content of the vanadium ores established the Colorado Plateau region as a major supply and possibly the largest raw material source of uranium and vanadium in the world.

Operations in the Colorado Plateau in this war period were extensive and profitable.

The efforts of thousands of small miners and claim owners were mobilized to expand production and extend the scope of mining. They met domestic production requirements for both the bomb job and the need of vanadium.

Upon the successful completion of the bomb the Manhattan District ordered the suspension of all uranium-producing operations in the Colorado Plateau, while foreign suppliers of raw materials were assisted to supply American needs.

There was bitter argument with the Manhattan District over this policy in the Colorado Plateau. The many independent miners who had contributed so much to the war-time production needs lost much of their investments. Many were forced to sell valuable holdings for a pittance.

Further complicating the situation was the filing of an Anti-Trust suit by the Department of Justice against the two large companies of the field and their associated companies, alleging collusion in restrictive practices relative to vanadium markets and control of the Colorado Plateau. This suit is still pending in the Colorado Courts.

When the newly organized Atomic Energy Commission began the procurement of uranium, only two of seven war-time plants were operating on a reduced capacity for vanadium. Planning of the Commission, as announced, followed the policy of subordinating uranium output to a by-product production of the vanadium companies.

The Colorado Plateau today is a scene of bustling vigor. Thousands of square miles of canon country are being probed with millions of feet of drill holes per year. New communities, new roads and dusty truck trains mark the transition of a frontier into a modern industrial community.

The unfolding wealth and abundance of our supply of uranium is again a testimonial to the ability of the American miner to produce in times of need.



The Mechanics of Uranium Production

By **SHELDON P. WIMPFEN**
Manager, Grand Junction Operations Office
U. S. Atomic Energy Commission

GOALS for government purchases of uranium concentrates, and in turn essentially the whole domestic uranium industry, are based on the amount of uranium metal required for atomic energy purposes.

Uranium production involves exploration or finding the ore body, mining the deposit and extraction of the uranium from its natural composite structure.

With the exception of (1) extensive exploration activity carried on by the U. S. Atomic Energy Commission and the U. S. Geological Survey, (2) the mining by AEC lessees of ore bodies discovered and delimited by government exploration and (3) the operation of the government-owned processing plant at Monticello, Utah, by an integrated AEC contractor, virtually the entire industry is privately financed and operated.

The major field of direct government performance is in exploration by surface and airborne reconnaissance, and by drilling, to locate and evaluate ore reserves. However, there is also a great deal of privately financed prospecting activity, some of which has been highly successful.

The Atomic Energy Commission, through its Domestic Uranium Program Circular 5, Revised, established a price

schedule generally applicable to uranium ore production in the western United States, principally the Colorado Plateau. The base price per pound for contained uranium ranges from \$1.50 for 0.10 percent U_3O_8 ore to \$3.50 for 0.20 percent U_3O_8 ore. Premiums of 75 cents or \$1 per pound are paid for ores of richer than 0.20 percent U_3O_8 grade and V_2O_5 content is paid for at 31 cents per pound. An additional development allowance of 50 cents per pound is applicable to all contained U_3O_8 .

Despite the sporadic nature of many ore deposits and remote physical locations, a survey of the operations of a representative segment of the ore producers indicated that uranium mining is profitable. Costs ranged from \$8 to \$28 and profits from \$5 to \$29 per ton. As a further indication that it is profitable to mine uranium, ore production currently exceeds milling capacity.

To encourage development and defray a portion of initial costs of opening a mine, a bonus, over and above the ore purchase price schedule, is paid on the first 10,000 lb of contained U_3O_8 from new discoveries. The bonus is on a sliding scale depending on the richness of the ore, with \$35,000 being the maximum amount payable.

When government exploration on lands withdrawn from the public domain for this purpose results in the discovery and delimitation of mineable blocks of ore, lessees are selected to perform the mining as private operations. The lessees are not eligible for the bonus applicable to private discoveries and pay a royalty to the government. The AEC selects the lessee for each ore block or physical area from the current list of 300 applicants. The selection procedure is designed to find the best possible operator for the specific mining job and is similar to normal procedure for selecting a particularly important employee. To date, all lessees have done excellent jobs of fully exploiting their leased ore reserves.

Ore deliveries are made to the nine currently operating

processing mills and to three additional ore-buying stations. To partially equalize economic conditions for the various mining locations, a limited ton-mile haulage allowance, offsetting a major portion of transportation costs, is paid to ore producers.

The AEC performs a continuing survey of ore sampling procedures at the various buying stations, with a highly acceptable degree of uniformity now obtaining throughout the industry for this important phase of the mineral production business. Four pulps are taken from every sample, one being used by the purchaser as a basis for payment for the ore, one going to the shipper and two being retained for possible umpire assay. The four designated umpire assayers have had infrequent calls for their services.

The processing mills remove the uranium from each ton of ore, reducing it to a concentrate of more than 50 percent U_3O_8 , requiring complicated processes. All mills except the Monticello plant are privately operated.

Methods of Processing Uranium Ores

By S. J. SWAINSON

Director, Mineral Dressing Laboratories
American Cyanamid Co.



ALTHOUGH much research work has been done, and is being done, on gravity, attrition and flotation concentration methods, the domestic ores of uranium, at the present time, are better treated by hydrometallurgical methods than by these concentration processes.

There are, in general, two main and different lixiviants used for leaching our domestic ores. The first is hot ($90^\circ C.$), 5 to 10 percent solutions of sodium carbonate. The second is dilute sulfuric acid. The type of ore to be treated usually determines which process is to be used.

As a rule, more ore types are amenable to the acid leach than to the carbonate and, usually, an ore amenable to both processes will yield more of its values to the acid procedure. Limestone ores and sandstone ores containing an appreciable amount of calcium carbonate are more economically treated by the hot soda ash leach.

All plants, whether acid or carbonate, use standard milling equipment and, except for the necessary acid-proofing in the former, are very similar to cyanide plants treating gold and silver ores. The processes used for uranium recovery are actually combination milling and chemical procedures.

Usually, finer grinding is necessary in the carbonate process but, outside of the Grants, N. M., plant grinding finer than grain size (35-48 mesh) is not necessary. Most of the ores are acid treated at 10 to 14 mesh and rapidly disintegrate to grain size when attacked by the acid.

Some difficulty is experienced in settling ores containing asphaltic and bentonitic materials. Baking the ores at low temperatures ($500^\circ C.$) eliminates the carbonaceous material, dehydrates the clays and generally enhances the settling rates. Flocculating agents also have been used to aid settling and filtering.

Most of the Colorado Plateau ores contain vanadium and the economical recovery of this metal ties in closely with the economics of uranium recovery. In fact, in all but the newer plants, recently built or contemplated, most of the operating plants are essentially vanadium mills with added uranium sections.

All of the mills, recovering vanadium, utilize multiple hearth, salt roasting techniques in which sodium chloride

reacts with the vanadium minerals to form the water soluble sodium vanadate. This is then dissolved in the subsequent leaching operation.

In the carbonate process, the dissolution of vanadium is made simultaneously with that of uranium and the two are separated by differential precipitation methods. In the acid process, the vanadium is first recovered in solution by an aqueous leach and the washed residues are then acid treated, at a low pH, for their uranium content.

In the past, one of the biggest drawbacks to the acid leach has been in the quantity and variety of impurities taken into solution along with the uranium. New purification processes, developed through research and which are "classified," have greatly alleviated this disadvantage and have made the acid process more attractive.

The older precipitation technique used on acid solutions is a complicated process in which the solutions are taken past neutral several times with alternate addition of acid and base. Some values are lost in discarded impurity sludges when this method is employed.

A standard procedure for stripping uranium values from carbonate solutions is by the addition of sodium hydroxide. The excess caustic is converted to sodium carbonate by carbon dioxide or sodium bicarbonate and the solutions reused for leaching.

Tax Problems Relating to Uranium Mining

By WILLIAM F. TILTON, JR.

Attorney

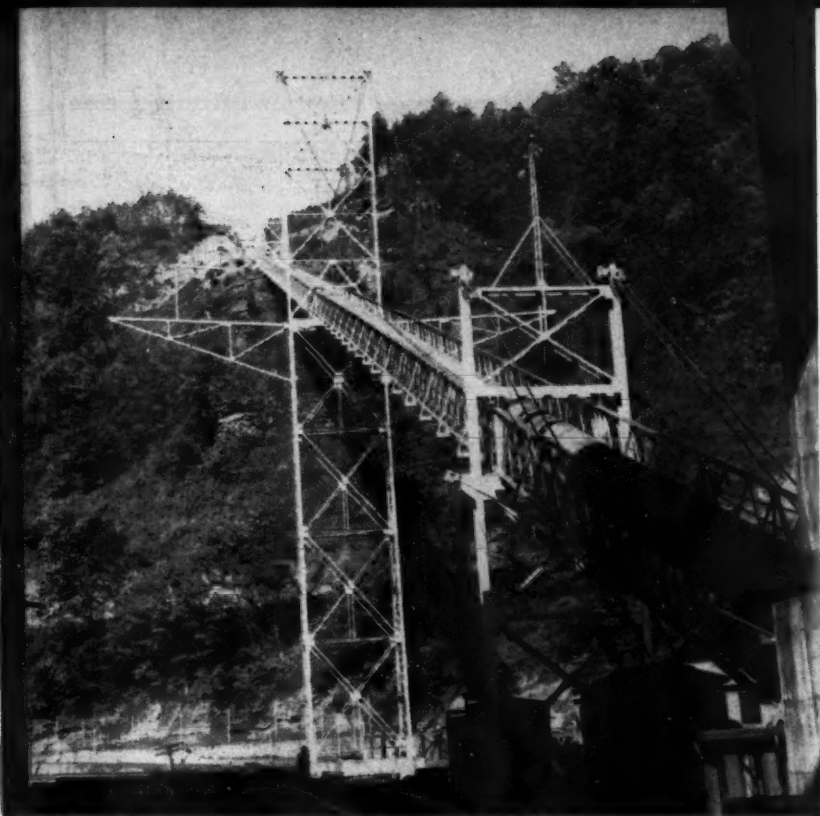
The Atchison, Topeka and Santa Fe
Railway System



A DISCUSSION of the tax problems associated with exploration expense, development expense, development allowances and initial production bonuses encountered by a company engaged in uranium mining. The conclusion reached is that present Federal tax laws can have the effect of deterring rather than stimulating exploration for and full production of uranium.



"Have confidence in the men who represent you. Give them a chance—what is good for the United States is good for you"



Increased mechanization and full seam mining have increased the problems of refuse disposal

Preparation Problems of Full Seam Mining

THE problem presented by full seam mining is the handling of additional refuse. Loading it at the face, transporting it through the mine, cleaning in the preparation plant and disposing of it, all adds to the cost. It is cost alone which determines whether this method of mining is economical.

In discussing this subject, the term "Full Seam" requires definition. Speaking geologically, it might refer to a section of considerable thickness of coal and rock. However, as a mining term (in this report), it is understood to mean the portion of the geologic section that is customarily mined. On this basis, "Full Seam" is intended to apply where the machine loads, with the coal (for cleaning plant separation), all partings or roof rock that in hand or selective mining are separated at the face, gobbled inside, or hauled outside as a separate product. In some cases, the height that constitutes the so-called full seam may be a matter of local understanding. For example, in the Pittsburgh coal it is the preferred practice to mine approximately seven ft, leav-

ing the top six or eight in. of the main bed for roof protection. If no partings are hand picked at the face, this would be considered a full seam operation in this report. However, the entire Pittsburgh Seam is from 10 to 11 ft high, with the top three ft containing alternate coal and slate. Except in cases of uncontrolled roof falls where the operator has no choice, it is seldom economical to mine that entire 11 ft, irrespective of whether or not this constitutes the full seam. The following comparison will illustrate the point.

One operation in the Pittsburgh Seam mines approximately 87 in. of seam height. This gives a yield of approximately 10,700 tons per acre run of mine, with 15 percent refuse, an ash of 6.4 percent and sulphur of 1.7 percent, washing at 1.40 specific gravity. If the full seam of approximately 131 in. is mined, the yield would be 18,200 tons per acre, of which 37 percent would be refuse and the clean coal would have an analysis of 7.5 percent ash and 2.00 percent sulphur. These results are also at

A Report of the Committee on Surface Preparation Citing Operations in Several Coal Fields that Show Factors to be Considered in Planning Complete Mechanical Handling and Separation of Impurities in a Coal Seam

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1.40 specific gravity. Following these calculations through, show that full seam mining produces an additional 7500 tons r.o.m. coal per acre, but of this, approximately 5000 tons are refuse. Also it should be noted that full seam mining results in a poorer final coal analysis, increasing the ash 1.1 percent and sulphur 0.3 percent. Therefore, it can be understood why the entire seam would not be mined by choice. Mine C illustrates the complications and expenses encountered when heavy roof rock is taken with the coal.

The Winifred Seam in West Virginia, has a problem in full seam mining though different from the other cases cited. The seam, as fully described in Report B, shows no choice; it is definitely a full seam operation, taking coal and refuse as they come. In this area, approximately 20 percent results as refuse.

In a West Virginia Field, the No. 2 Gas and Powellton Seams are bedded close together with a parting about 30 in., composed of slate, rock, and coal. The full seam must be taken and the refuse properly disposed of. The Report on Mine D states that with full seam mining, none of the slate is gobbled and approximately 20 percent of the total tonnage mined at the face is rejected.

Report A—Pittsburgh Seam

The accompanying tabulation of analyses are yearly averages and tell a consecutive story of the development of mechanical coal cleaning as influenced by the transition from hand to mechanical loading, the introduction of continuous mining and the use of roof bolts.

Mine B—Winifred Seam

The Winifred coal seam mined in Kanawha County, W. Va., varies in thickness from 60 to 70 in. and contains several streaks of slate impurities all of which are mined run of face. Because of the variation in the seam conditions, it is not possible to show a "typical" section. Perhaps a better description can be made by the accompanying borehole sections in the vicinity of present mining.

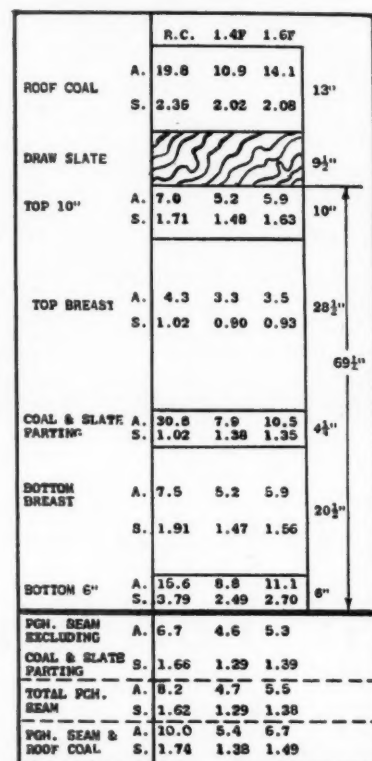
From the seam sections it is obvious that selective mining would be out of the question. The total seam is mined with no underground gobbing and sent to the cleaning plant where pickers remove the plus five-in. slate on a shaker screen-picking table. A separate scalper deck is provided to permit the plus 10-in. slate to be discharged directly into the refuse bin while any coal in this size is diverted back into the coal. The plus five-in. coal is

A		B		C	
Coal	8 in.	Coal	11 in.	Coal	9 in.
Slate	3 "	Slate	5 "	Slate	3 "
Coal	25 "	Coal	22 "	Coal	20 "
Sandstone	6 "	Slate	3 "	Slate	2 "
Coal	18 "	Coal	6 "	Coal	5 "
		Sandstone	7 "	Sandstone	13 "
		Coal	17 "	Coal	16 "
Coal	51 "	Coal	56 "	Coal	50 "
Slate	9 "	Slate	15 "	Slate	18 "
Total	60 "	Total	71 "	Total	68 "

Typical borehole sections of the Winifred coal seam (Mine B)

crushed and combined with the natural 5 in. by 0 for prescreening ahead of the washer. The ¼ in. by 0 is removed on vibrating screens where the slack is bypassed to the cleaned product. The 5 in. by ¼ in. is washed in a Baum Jig and dewatered on vibrating screens. The cleaning plant at this mine was designed to handle the full seam product from the beginning. Therefore, no additions have been necessary.

The coal is marketed for steam at the present time. Naturally, the Btu factor is affected directly by the ash and moisture, however, the washed coal, after crushing, and raw slack are mixed to make the final shipped product. On this basis, it is not necessary to clean the fine coal because a suitable



Typical seam section at one mine in the Pittsburgh seam (Mine C)

product can be obtained without the extra expenditure.

Approximately 68 percent of the coal is washed and 32 percent is slack which is bypassed. About 40 percent of the feed to the washer is rejected while on the r.o.m. feed basis, 74 percent is recovered as coal and 27 percent is the total refuse. Weightometers on the r.o.m. belt and final clean coal belt give accurate tonnage readings.

Slate from the picking table and the washer rejects are sent to a 300-ton refuse bin, from which two 25-ton trucks haul the refuse to the disposal area about one mile (round trip) from the cleaning plant. The roadway is built of reject material, by scrapers and bulldozers as travel progresses.

During a six-month period in 1952, about 175,600 tons of clean coal were

	Raw Coal Ash %	Clean Coal Ash %	Raw Coal Sulphur %	Clean Coal Sulphur %	Mechanical Loading %	Washer Refuse %
1920	8.1	..	1.12	..	..	..
1921	8.6	..	1.17	..	..	..
1922	8.0	..	1.31	..	..	..
1923	9.0	..	1.30	..	..	..
1924	8.6	..	1.29	..	..	..
1925	8.6	..	1.20	..	..	..
1926	8.6	..	1.30	..	..	..
1927	9.0	..	1.25	..	..	..
1928	9.0	..	1.20	..	..	..
1929	Cleaning plant started. Coarse and fine coal Rheolaveurs, Bradford Breaker and coarse coal mixing bins installed.					
1929	9.0	..	1.30	..	..	..
1930	9.1	6.6	1.34	1.08	..	8.8
1931	9.0	6.8	1.52	1.21	..	7.4
1932	9.1	6.7	1.52	1.20	..	3.0
1933	9.1	6.9	1.59	1.25	..	5.5
1934	9.0	6.9	1.59	1.25	..	4.8
1935	9.0	7.0	1.55	1.25	..	4.8
1936	All hand loading prior to 1936. Mechanical loading started.					
1936	9.0	7.0	1.58	1.27	0	4.1
1937	9.0	7.0	1.58	1.27	10	5.0
1938	9.0	7.0	1.67	1.30	26	5.4
1939	9.4	7.0	1.72	1.33	32	5.6
1940	10.4	7.0	1.56	1.25	32	7.1
1941	11.6	7.3	1.64	1.32	74	9.2
1942	100% mechanical loading by 1942.					
1942	12.6	7.6	1.95	1.50	84	10.3
1943	13.4	8.0	1.88	1.49	100	10.6
1944	13.7	8.2	2.00	1.57	..	8.2
1945	15.5	8.4	2.14	1.66	..	11.2
1946	16.7	8.3	2.14	1.67	..	15.0
1947	18.2	8.6	2.08	1.63	..	15.9
1948	20.8	8.8	2.12	1.66	..	18.0
1949	20.6	9.2	2.44	1.88	..	19.2
1950	Picking tables and crushers installed to replace Bradford Breaker. One continuous mining machine purchased. Mine rock passes over picking table.					
1950	21.6	9.3	2.41	1.88	..	22.7
1951	During 1951 and 1952 coarse coal washing plant replaced by dense media. Concentrating tables added to fine coal circuit.					
1951	18.7	8.5	2.52	1.89	..	23.0
1952	Roof bolting started.					
1952	16.6	7.4	2.53	1.70	..	26.0
1953 (6 mo.)	16.5	7.4	2.48	1.65	..	21.0

* After Bradford Breaker and picking table.

Yearly average of coal analyses at one mine in the Pittsburgh seam (Mine A)

	Sample 1			Sample 2			Sample 3			Sample 4			Sample 5		
	Raw Coal	1.4 Float	1.6 Float	Raw Coal	1.4 Float	1.6 Float	Raw Coal	1.4 Float	1.6 Float	Raw Coal	1.4 Float	1.6 Float	Raw Coal	1.4 Float	1.6 Float
Pittsburgh Seam Excluding Coal & Slate Parting															
Ash	6.1	4.5	5.1	6.7	4.7	5.5	6.7	4.3	4.7	6.8	4.7	5.5	7.1	4.6	5.3
Sulphur	1.31	1.10	1.19	1.98	1.53	1.67	1.95	1.18	1.23	1.50	1.25	1.32	1.38	1.11	1.19
Total Pittsburgh Seam															
Ash	7.4	4.6	5.3	8.0	4.8	5.8	8.4	4.4	4.9	8.2	4.7	5.6	8.9	4.7	5.5
Sulphur	1.30	1.11	1.20	1.94	1.54	1.67	1.88	1.18	1.23	1.46	1.25	1.31	1.35	1.11	1.19
Pittsburgh Seam & Roof Coal															
Ash	9.6	6.0	7.8	9.2	5.4	6.6	9.8	5.5	6.4	10.2	5.2	6.6	11.0	5.1	6.4
Sulphur	1.19	1.07	1.11	2.16	1.63	1.78	1.82	1.25	1.30	1.62	1.36	1.47	1.57	1.22	1.35

Sample coal seam analyses at one mine in the Pittsburgh seam (Mine C)

shipped and 64,000 tons of refuse were handled by trucks as described above. The costs per ton of clean coal for the following are tabulated below.

\$0.055—Hand Picking

\$0.078—Washing*

\$0.041—Trucking Refuse

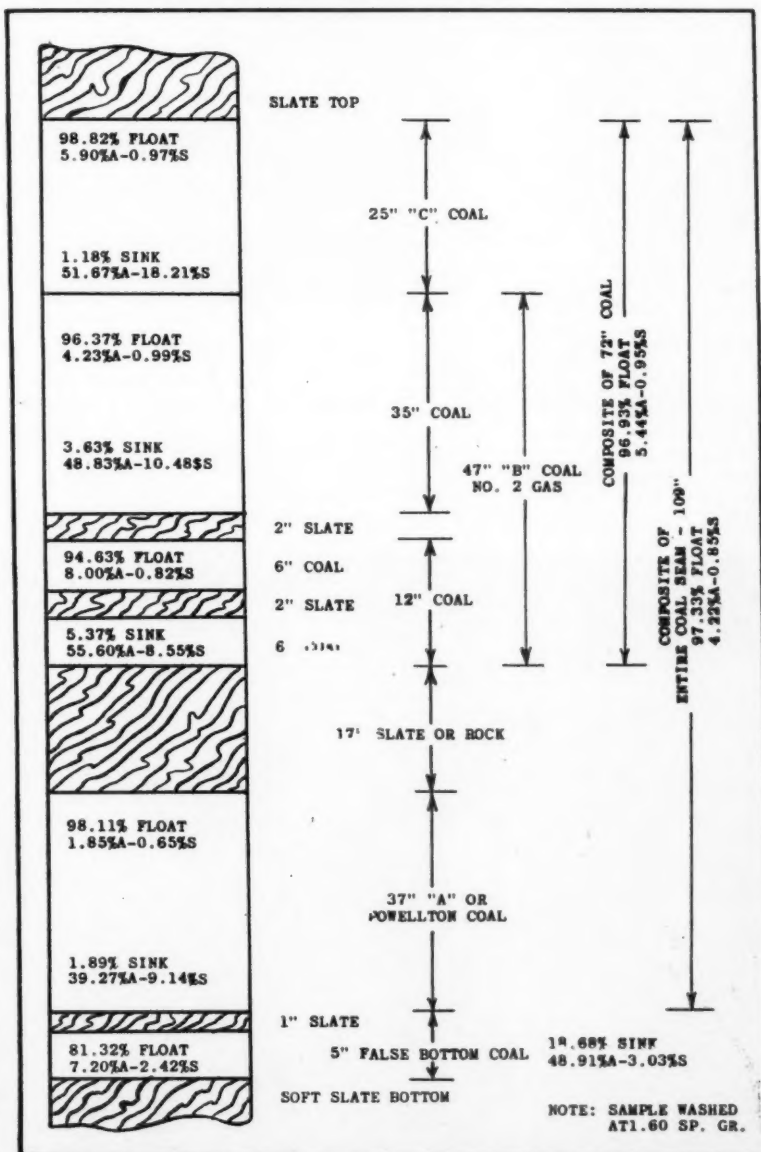
It is to be noted that the above costs include only labor and maintenance. Depreciation, amortization, overhead, taxes, insurance etc., must be added to the costs indicated. Also, as the truck haulage becomes longer in mileage the refuse trucking costs will become higher.

Mine C—Pittsburgh Seam

A typical problem encountered at a mine located in Allegheny County, Pa., in the Pittsburgh Seam, was to determine the quality characteristics of the coal seam in various areas and at the same time obtain information which would help in predicting the quality of coal to be mined in the future. In order to do this, various samples were taken and those shown are composites of three samples representative of various areas in the same mine. When information is obtained on the ash and sulphur of the raw coal, the 1.40 float, and the 1.60 float, a further separation is made which includes the product in the coal and slate parting and the effect of the roof coal on the overall product. Although the slate samples show an average thickness of somewhat less than 11½ in., this mine is faced with the problem of handling pieces of slate in excess of six ft in length, wider than 42 in., and thicker than 22 in. Improved methods of shooting in the mine have had a marked effect on the size consist of the coal as well as the slate.

This plant furnishes raw coal to a central cleaning plant. Eleven years ago, an aerial tram for rock disposal from the mine was built to handle approximately 250 tph. In the ensuing years the amount of rock handled by

* The washing cost is not typical. Coal is loaded into barges and therefore the manpower is unusually low at the cleaning plant.



Typical seam section at a mine in the No. 2 Gas and Powellton coal seams (Mine D)

the tram has decreased to roughly a total of 100 tpd; the remainder of the slate is now a part of the seam mined. The material handling system of the raw coal at this plant is now wholly inadequate and there is the possibility of a complete revamping. Eleven years ago a 48-in. belt was sufficient to handle the largest rock mined and now scalpers are attached to the end of the feeders, over which the plus 14 to 16-in. product is scalped out before being loaded into railroad cars for transportation to the central plant. Coal now trapped going over the scalper is recovered by pickers off the slate belt and put into another bin, either to be remixed with the raw feed or sold as house coal. Many pieces of rock in excess of one ton weight have presented a number of difficulties at the mine, such as destruction of bin bottoms, conveyor flights, loading booms, mine cars, rotary dump, and slate disposal facilities. The plans for changes in this set-up, contemplate the installation of a 600-tph vibrating feeder, large capacity rock type crusher, slope, and belt in order to have a product that can be handled with ordinary equipment.

The central plant, where a product is prepared for steam, domestic and metallurgical purposes, has a capacity in excess of 1200 tph. This is a plant in which launders, heavy media, and oil flotation are used in the preparation of its various sizes. Using 60-in. r.o.m. belts, reciprocating picking tables, and a large rock crusher there is a bottle-neck at the bottom of our rotary car dump. Here two feeders located at the feed end of the belt at 90° to it, both feeders being five ft wide, are too small to prevent bridging

when the large slate that falls through the scalper at times bridges the discharge of the common chute to the belt.

It would not be economically feasible to change the feeder set-up at the central plant to handle this size because of the very nature of the original installation, so the changes are made at the raw plant. This product may run 80 to 90 percent mine rock when mine cars are dumped incorrectly, making it impossible to hand-pick a marketable 4-in. by 6-in. size. The result was that in the place of an existing picking table, a heavy media separator was installed and raised the top size to about eight in. This, in turn, meant a re-assembled conveying system of the various sizes produced through this separator. All-seam mining also affected the amount of reject material in the four in. separator, so a separator of the heavy media type was installed in series with the existing rewash set-up. The feed to this unit in numerous instances exceeds 50 percent sink and a 50-50 split is necessary to make a marketable product. In order to overcome the increase in fine sizes due to all seam mining, air shooting has been employed.

The result of all these changes is that an extensive layout of money was necessary in order to properly handle the slate. This plant cleans in excess of 17,000 tons of raw coal a day, of which about 5000 tons are disposed of as refuse. This presents the problem of disposal without pollution of the air and watershed. In conclusion, it should be pointed out that the simple job started with at the face has now

become a snowballing headache, requiring the best efforts of all of those engaged in mining.

Mine D—No. 2 Gas and Powellton Seams

This account describes the slate handling methods and gives data on an operation that has used full seam mining for several years in West Virginia. As illustrated by the typical section, two seams of coal, namely the No. 2 Gas and the Powellton, are mined. Where the interval is not over three ft, the seams are mined together—full seam mining. The conventional method of undercutting and mechanically loading into mine cars is used.

At the head house the raw product is put over a scalping screen. Large lumps of coal are broken by manpower and fall through the screen. The large rock is conveyed to a crusher, and the crushed rock is taken to the refuse pile by an aerial tram. Smaller rock passing through the scalping screen with the coal is removed with a Bradford Breaker at the tippie. Refuse from the wet and dry cleaning units and the breaker is conveyed to the aerial tram.

In the mine, no slate, to speak of, is gobbled. About 20 percent of the total tonnage at the face is rejects; some sections of course will run considerably above the 20 percent average rejects.

Following is a summary of the average costs for labor, per ton clean coal:

Hauling slate to tippie.....	\$0.0405
Mechanical cleaning	0.1448
Refuse—aerial tram	0.0150

Total	\$0.2003
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Separating impurities at the face is eliminated by full-seam mining

Trackless Mining

(Continued from page 29)

Two Jumbos—two loaders and two trucks on the 1900 and same on the 1700-ft levels.

The ore here is hauled from heading to ore pocket ahead of primary jaw crushers. From the 1700 and 1900-ft levels the ore is transported to the surface by conveyor belts consisting of one section 1450 ft long from 1900-ft level to the surface and one section 1200 ft long from 1700 to 1900-ft level. The 1700 and 1900-ft levels have been side swiping, drifting, taking down and trimming backs in new mining areas and with little benching done to date. The average performance on these levels has been approximately 75 tons per miner shift, 165 tons per loader operator shift and 145 tons per truck driver shift.

Halve Mining Cost

The cost for trackless mining for a 12 months period has been approximately \$1.14 per ton as compared to \$2.15 per ton for scraper mining. The average tonnage per man, counting drilling, loading, trucking, repair, and development labor has averaged approximately 25 tons per man shift as compared to eight tons per man shift on scraper mining, counting drilling, scraping, tramping, repair labor and development labor.

	Conventional	Trackless
Mining	\$1.06	\$0.51
Mucking (Loading)	0.31	0.08
Tramping	0.30	0.17
Supervision	0.15	0.08
Repair	0.33	0.30

For a total of .. \$2.15 \$1.14

Diesel motors underground require 75 cu ft of air per minute per each brake horsepower. The gases from diesel motors in proper operating condition, proper scrubbers, and adequate ventilation are from a safety standpoint unharmed.

Trackless mining equipment has made less common labor and increased the need for semi-skilled labor. The mechanization of equipment has lessened the amount of physical effort and saved time in setting up and tearing down of equipment thereby increasing the time spent in productive work. At the present time 65 percent of ore is coming from trackless mining headings with 40 percent of the men and 35 percent of ore is being mined from track mining headings with 60 percent of the men. The manufacturers have been very cooperative and helpful in making changes or recommendations for improvements in the operation and designs of equipment. The use of trackless mining equipment underground at the Pend Oreille Mines & Metals Co. has increased the tons per man shift and decreased costs per ton to make the operation a profitable instead of a non-profitable operation under the present low metal price.



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Wheels of GOVERNMENT



As Viewed by HARRY L. MOFFETT of the American Mining Congress

THE honeymoon days of the Eisenhower Administration are over. Attacks are increasing from many quarters on major policies involving the farm program, the nation's finances, domestic mineral programs, tariffs, foreign aid, and a host of minor issues. The kid gloves are off since elections are just around the corner, and many of the sharp attacks on policies are leveled directly at the President. For this reason alone the next session of Congress promises to be one of the most interesting in recent years.

The Administration, meanwhile, is quietly drafting its legislative program for submission to the national legislature in January. Some of its major proposals, however, will have to await the outcome of studies being made by the commissions appointed to review such matters as foreign economic policy, Federal-State relationships, Government reorganization, mineral policy and various lesser matters. Senate Majority Leader Knowland (Rep., Calif.) has let it be known that Congressional leaders will work with the Administration in the development of the legislative program for next year.

Controversial legislation will face tough going in the next Congress, due to the extremely slight hold the majority party has upon the two Houses. With the appointment of Mayor Tom Burke, Democratic Mayor of Cleveland to succeed the late Senator Taft, the make-up of the Senate is now 48 Democrats, 47 Republicans and one Independent (Senator Morse of Oregon). Since Morse has said that he will vote to retain Republican control of the Senate and the Vice President can break a tie vote, the Senate will remain under Republican control and the important committee posts will remain in the majority party's hands. In the House there are 219 Republicans, 211 Democrats, one Independent, and four vacancies. No change is expected in top committee posts in the House.

National Mineral Policy in Making

At the Annual Metal and Nonmetallic Mining Convention of the American Mining Congress in Seattle, in late September, the mining industry came out with a strong policy declaration, urging in terse but pointed language, the adoption of a national minerals policy. The resolution stated in part—"Since it is recognized that the production of the mining industry is essential to national security, we call attention to the startling fact that for years the Federal Government has lacked a constructive domestic mineral policy. We urge that this serious defect be corrected and that such a policy be adopted and announced."

Slightly over a month after this resolution was adopted by the mining industry, President Eisenhower named a top-level committee composed of Interior Secretary Douglas McKay, Secretary of State John Foster Dulles, Commerce Secretary Sinclair Weeks, and ODM Director Arthur S. Flemming to prepare a recommended national minerals policy for consideration by the President and his Cabinet.

In a letter to Secretary McKay, naming him chairman of the committee, the President said:

"One of the essential problems before our country is the establishment of a national policy relating to the production and utilization of minerals and metals. The prudent use and development of domestic mineral resources, as well as assured access to necessary sources abroad, are indispensable to the operation of an active economy and a sound defense.

"We must make sure, as Americans, that we have available mineral raw materials adequate to meet any contingency during the uncertain years ahead. Chronic shortages of many minerals and metals have plagued us during every emergency,

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Washington Highlights

MINERAL POLICY: Being drafted.

U.S. MINERAL SUPPLY: Under study.

TRADE POLICY: Randall Commission holds hearings.

NLRB: Adopts strong policies.

RESOURCES CONFERENCE: Energy group named.

COMMERCE DEPARTMENT: Reorganizes.

MINE SAFETY CODE: Revised.

BLM: Survey team appointed.

★ ★ ★ ★ ★ ★ ★ ★

and the strength to meet any new crisis in large measure will depend on our ability to obtain these materials in sufficient amounts. The problem is compounded, of course, by the ever growing requirements of an expanded economy.

"As we look forward to the resolution of this problem, we now face depressed conditions within numerous metal mining districts, conditions that are a matter of grave national concern. The mining industry has contributed in large measure to our present state of preparedness through vigorous expansion of its facilities. Every effort should be made to preserve this newly added economic strength through policies that would be consistent with our other national and international policies."

The committee was instructed to complete its study and have its recommendations ready "well before" the date that the U. S. Tariff Commission reports to Congress on its investigation of the present situation in the lead and zinc mining industries—March 31, 1954. It is understood that the major share of the work done in preparing the minerals policy recommendations will be under the direction of Assistant Secretary of the Interior Felix Wormser.

U. S. Mineral Situation Studied

Also during the Mining Congress meeting, the Minerals, Materials, and Fuels Economic Subcommittee of the Senate Interior Committee, headed by Senator George W. Malone (Rep., Nev.), held closed door sessions with mining representatives, in preparation for an investigation into the accessibility of critical raw materials to the United States in time of war. Other hearings were held in Henderson, Nev., and Washington, D. C.

Public hearings in Washington opened on October 20, with Interior Secretary McKay strongly supporting the need for a sound domestic mining industry. Assistant Secretary Wormser likewise came out for policies that would strengthen the domestic industry and alleviate the depressed conditions existing in important branches of the industry today.

Highlight of the opening day's testimony was the submission of charts by the U. S. Bureau of Mines which showed that the Western Hemisphere could be self-sufficient in all minerals except industrial diamonds.

Rep. Tom Martin (Rep., Pa.) told the committee that long-standing State Department policies have had detrimental effects upon U. S. stockpile and defense programs. He said that U. S. participation in the International Materials Conference, which he labeled as contrary to the will of Congress, had adversely affected the carrying out of stockpile objectives. He also charged that the IMC was responsible in no small degree for the instability in our metal markets.

A series of mining industry witnesses urged strengthening of the domestic industry and adoption of policies designed to utilize domestic resources to the fullest extent in times of national emergency. These included Otto Herres, chairman of the National Lead and Zinc Committee; S. H. Williston, vice-president, Cordero Mining Co.; Fay I. Bristol, president, Oregon Mining Association; W. Lunsford Long, president, The Tungsten Institute; James P. Bradley, vice-president, Bradley Mining Co.; and Miles P. Romney, manager, Utah Mining Association. Additional open hearings were held in Los Angeles and Salt Lake City in late November.

Foreign Trade Policy Hearings

Following executive sessions on October 21, the Commission on Foreign Economic Policy, headed by Clarence Randall, opened brief public hearings in Washington, October 28.

At the open hearings, a parade of labor union officials and numerous industry leaders sought a freer trade policy. Few witnesses called upon the Commission to strengthen tariff pro-

tection for domestic industries which have been hard hit by foreign imports.

In addition to hearings, the Commission has also asked a large number of industrial, farm and labor organizations and private individuals to set forth in writing their views on U. S. foreign trade and economic policies. It is likely that many of the replies to the Committee's request for information will call for increased tariffs rather than the slashing of the already low rates on imports depressing important segments of American industry.

The Commission is required to report its findings to Congress early next March.

Meanwhile, hearings have been held before the U. S. Tariff Commission on the injury being sustained by the domestic lead-zinc mining industry. Numerous industry witnesses have scored Government policies which have permitted the dumping of foreign metal into domestic markets, thus depressing prices and closing down a major portion of the industry, and have urged the Commission to recommend greater tariff protection.

NLRB Policy Shifts

Chairman Guy Farmer of the National Labor Relations Board has flatly declared that the present Board will not treat prior NLRB decisions as binding upon it. He announced that the Board has no intention of lightly tossing aside "the opinions of those men who preceded us on the Board . . . but, no precedent is good if it is wrong, and we do not propose to treat a prior decision as a strait-jacket, binding our discretion and unduly restricting us in the exercise of independent judgment as to Congressional intent."

Farmer also has pointed out that the Board plans to restrict its activities to cases having a substantial impact on interstate commerce, and to let local problems be settled on a local basis by the citizens of the community involved.

The Board has also declared that it will refuse to conduct an election for a union having officers who are under indictment for filing false non-Communist affidavits, unless such a union is challenged by another union. In these cases, if the suspect union wins, the NLRB will refuse to certify it as the collective bargaining agent until its officers are cleared of the indictments. The Board will continue to revoke certifications of unions whose officers are convicted of filing false non-Communist oaths.

Resources Conference Energy Group Named

The naming of a steering committee on Energy Resource Problems completes the list of the eight such groups which will guide discussions

at the Mid-Century Conference on Resources for the Future to be held in Washington, December 2-4.

This committee, which will cover resources matters dealing with coal, petroleum, natural gas, and water power, is headed by Farrington Daniels, head of the Department of Chemistry of the University of Wisconsin. Co-chairman of the committee is George M. Gadsby, president of the Utah Power and Light Co.

Weeks Forms New Business Administration

Commerce Secretary Sinclair Weeks has established a Business and Defense Services Administration within the Commerce Department.

This agency will continue the functions of the National Production Authority with respect to defense and mobilization activities. Charles F. Honeywell, a business executive from California, heads up the agency. He is assisted by Samuel N. Comly, Leonard E. Pasek, and S. A. Crabtree, all of whom are on loan from industry.

Within the new agency there are some 25 industry divisions which are responsible for administering the Defense Materials System, reviewing and recommending industry expansion goals, tax amortization, and domestic loan applications.

Mining machinery manufacturers will be pleased to learn that John P. Courtwright, president of the Marion Power Shovel Co., and chairman of the AMC Manufacturers Division, has been appointed as a mining equipment consultant to the Agricultural, Construction and Mining Equipment Division of the new agency.

Revised Mine Safety Code Issued

The Bureau of Mines has issued a revised safety code for bituminous coal and lignite mines which includes regulations covering technological developments since the first code was issued in 1946. The revised code includes several new provisions governing mine roof support. It also deals with precautions necessary to minimize dangers from use of high speed mechanical equipment, and makes some changes with reference to mine ventilation.

Black blasting powder would be eliminated from use in small underground operations, and the code also provides for rock-dusting to within at least 40 ft of working faces.

BLM Study Under Way

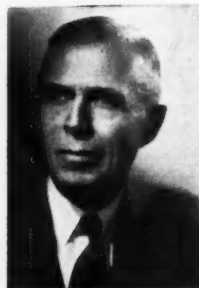
Interior Secretary McKay has appointed a six-man survey team to study organization and operations of the Bureau of Land Management. The

(Continued on page 118)



Personals

A veteran of 35 years with Texas Gulf Sulphur Co., **H. E. Treichler**, vice-president, retired from the company October 1.



Treichler joined the company on September 1, 1918, just before it began operations. He was acting general manager and later general manager in charge of production from 1928 until the first of this year.

Leonard J. Timms, formerly assistant to the president, Premier Pocahontas Co. and Eastern Coal Corp., has accepted a position as assistant to the vice-president of New River and Pocahontas Consolidated Coal Co.

Appointment of **W. Howard Winn** as smelter superintendent of the Chino Mines Div., Kennecott Copper Corp., has been announced by W. H. Goodrich, Chino general manager. At the same time **Wesley Dow** was named assistant smelter superintendent. Winn succeeds **E. A. Slover**, who recently was named assistant general manager at Chino.

Robert M. von Storch, superintendent of Hudson Coal Co.'s Loree Colliery, resigned that position to join the U. S. Steel Corp. in Utah. He was succeeded by **William W. Martin**, assistant superintendent at Eddy Creek Colliery. Martin was succeeded by **Ralph W. Smith**, who is transferring from a similar position at Pine Ridge Colliery.

Henry R. Colen, formerly with the New Jersey Zinc Co. at Gilman, Colo., is now mining engineer with International Minerals and Chemical Corp., Columbia, Tenn.

Harry J. Connolly has been succeeded by **Ralph A. Lambert**, formerly vice-president and general manager, Pennsylvania Coal Co., as president of the company, of Northwestern Mining & Exchange Co. and The Blossburg Coal Co. Connolly, who has been

president since 1939, was named chairman of the Board of Directors and will continue to represent the company on industry committees. Lambert joined Pennsylvania Coal Co. as assistant mining engineer in 1940.

Gordon McCulloch has accepted a position as electrical, mechanical and maintenance superintendent at Howe Sound Mining Co.'s Chelan Division in Holden, Wash. He formerly was power superintendent for Northwest Magnetite Co.

James B. Colson recently replaced **R. F. Robinson** as chief geologist for the Sunshine Mining Co. Robinson is now with the U. S. Geological Survey, Defense Minerals Exploration Administration Branch.

Charles Bentley, 76-year-old analyst for the engineering and mining experiment station of the South Dakota School of Mines at Rapid City, S. Dak., retired July 1. He has been in mining work since the turn of the century, his first job being with the Denver Smelter Co. at Deadwood, S. Dak. He also was assayer at the Bonanza Mine in Nicaragua. In 1916 he came to the School of Mines.

George H. Rollins has been elected secretary and assistant treasurer of the Kemmerer Coal Co. and associate companies. He succeeds **James McNamara**, who resigned.

F. J. Haller has been appointed vice-president of operations for the North Range Mining Co. Haller came to North Range from Cleveland-Cliffs Iron Co., where he had been manager of Michigan mines. At the same time **C. W. Nicolson** was named to the newly created position of consulting engineer, in charge of new developments for North Range Mining Co.

Kenneth Williams, formerly superintendent, Pardee & Curtin, has been appointed coal mining tool sales representative in the Fairmont, W. Va., area by the Carboly Department of General Electric Co. At the same time, **Joseph Pushey**, drilling and blasting supervisor, Rimersburg Coal Co., was appointed to a similar position in central West Virginia.

Prior to his association with Pardee

& Curtin, Williams was safety director at Weirton Steel Co., and one time an inspector for the West Virginia Department of Mines. He will make his headquarters in Morgantown, W. Va.

A native of Jefferson, Pa., **Pushey**, from 1942 to 1947 was associated with the Bureau of Mines on explosive research. Prior to that he was involved in safety and blasting work with Mather Collieries Co., Mather, Pa. Pushey will make the Pittsburgh, Pa., office of Carboly Department his headquarters.

John C. Mitchell is now manager of uranium-vanadium mines for the Climax Uranium Co. with headquarters in Grand Junction, Colo. He was formerly district mine superintendent at Leadville, Colo., for the American Smelting and Refining Co.

George L. Judy has been promoted from general superintendent to vice-president of Consolidation Coal Co., (W. Va.) Division of Pittsburgh Consolidation Coal Co.

Harlan A. Walker, for many years identified with Homestake Mining Co. and since his retirement from that company, a consultant in Salt Lake City, is now vice-president and general manager of the Marcona Mining Co. with headquarters in Lima, Peru. His new address is Apartado 1229, Lima, Peru.

William Wilkes, retired mine superintendent and **John Sorbie**, retired section foreman, both of Rock Springs, Wyo., were honored at a dinner there recently by some 40 staff officials of



Wm. Wilkes



John Sorbie

the Union Pacific Coal Co. As tokens of respect and esteem for their long and faithful services, Wilkes was presented with a fine rod and reel and Sorbie with a wrist watch.

Both men have had more than 50 years' service in the company's coal mines with enviable safety records. Sorbie can boast of 57 years without a lost-time injury, while mines under Wilkes' supervision have won both Sentinels of Safety and Joseph A. Holmes awards. He personally has taken part in difficult and dangerous rescue operations and was awarded a gold watch by the company for his part in these activities.

E. F. Miller has resigned his position as vice-president of Westmoreland Coal Co., Madison, W. Va., to return to the Cia. Carbonifera de Sabinas S.A. at Rosita, Coahuila,



Miller will manage four coal mines that produce approximately 80 percent of Mexico's by-product coal.

Arnold Hill has been appointed superintendent of the Hill-Trumbull Iron Mine of the Cleveland-Cliffs Iron Co. He was formerly superintendent of the Sargent Iron Mine. Hill succeeds Hugh J. Leach, who is now manager of the Minnesota ore operations of Cleveland-Cliffs.

Peabody Coal Co. has announced the appointment of Joseph Craggs as field superintendent of operations. Craggs was formerly assistant division superintendent for Illinois Mines. He joined Peabody in 1934 as a rock picker at Mine 8, Pawnee, Ill., and has risen through the ranks as wireman, repairman, face boss, mine manager, mine superintendent and assistant division superintendent for Illinois Mines.

E. L. Beutner, resident geologist for the Michigan Ore Division of Jones & Laughlin Steel Corp., has been promoted to assistant chief geologist at Pittsburgh. G. A. Hoffman, geologist at the Tracy Mine, succeeds Beutner as resident geologist.

August Vandale will be in charge of the Ocean, Warden and Somers Mines of the Pittsburgh Coal Co., Division of Pittsburgh Consolidation Coal Co., as division superintendent in addition to his previous duties as division superintendent of the Westland Division. Tom Ferguson, vice-president of Pittsburgh Coal, made the announcement recently.

The naming of J. K. Hayes as supervisor of raw materials exploration for Utah operations of the Columbia-Geneva Steel Div., U. S. Steel Corp. has been announced. Hayes was manager of the Keigley Quarry.

At the same time the appointments of Ray W. Pett as superintendent, Keigley Quarry; Melvin A. Sharp as superintendent, Geneva coal mine, and Robert M. von Storch as superintendent, Columbia coal mine, were made.

Robert D. O'Brien, former manager of Highland-Surprise Consolidated Mining Co., has been sent to Japan, where he will be assistant territorial supervisor of export sales for Eimco Corp.

L. S. Gillespie, formerly mining engineer for the Stith Coal Co., has been made general superintendent of mines for that company.

Calumet & Hecla, Inc., recently announced that Don W. Blend has been elected a vice-president of that company.

R. E. Mitchell has retired as superintendent at the Eccles operation of the Eastern Gas & Fuel Associates. C. A. Perdue, superintendent of the Keystone mine, has been transferred to Eccles, succeeding Mitchell. Cleophus Short, superintendent at Kopperston, has replaced Perdue at Keystone and has been replaced at Kopperston by William Laird, formerly superintendent at Wharton No. 1 mine. Laird succeeded as superintendent at Wharton No. 1 mine by D. P. Shupe, Carswell superintendent.

Charles R. Bird has been appointed Pension Plan Administrator, Western Mining Divisions, Kennecott Copper Corp.

William Edmunds has resigned as chief engineer of the Valley Camp Co.

L. O. Lindberg has been elected president of the Sun Valley Lead-Silver Mines, Inc. He succeeds Ross L. Roundy, who had been president and manager of the firm since its organization in 1948. Roundy retired because of ill health.

The Board of Directors of The Pittsburgh & Midway Coal Mining Co. has announced the following appointments.

H. H. Spencer, formerly vice-president and treasurer, has been appointed chairman of the Board. Edwin R. Phelps, formerly general production manager, has been appointed vice-president in charge of operations. H. J. Hofmeister, formerly assistant secretary and assistant treasurer, has been appointed treasurer.

New members elected to the Board of Directors include Edwin R. Phelps, H. J. Hofmeister and J. G. Spencer.

Messrs. H. H. Spencer, Edwin R. Phelps and H. J. Hofmeister will continue to make their headquarters at the company's General Operating and Accounting offices in Pittsburgh, Kans.

Kenneth A. Spencer, who was re-appointed president, headquarters at the company's General Administration and Sales offices in Kansas City, Mo.

—Obituaries—

Joseph Wesley Ady, 71, a widely known Colorado mining engineer and former Cripple Creek millionaire, died of a heart attack September 29. Ady was at one time associated with the Portland Gold Mining Co. in Cripple Creek, Colo., and later with the Cresson Gold Mining Co. and the First National Bank in that gold camp.

He was born in Newton, Kans., graduated from both the University of Michigan and the Sheffield scientific school at Yale University, and once headed the Peerless Oil Co.

H. A. Reid, 56, vice-president in charge of operations for The United Electric Coal Companies since 1941, died in Chicago, on October 20, 1953.

Mr. Reid, better known as "Gus"

to his many friends in the coal mining fraternity, was born in Georgetown, Ill., March 15, 1897. After service in World War I his first connection with the mining industry was with U. S.



Steel Corp. at Danville, Ill. In 1924 he joined The United Electric Coal Companies as mining engineer. Subsequent promotions led to chief engineer in charge of all operations and the vice-presidency in 1941.

The engineering and construction of the companies' Buckheart and Fidelity Mines in Fulton and Perry Counties, Ill., were under his supervision. These are two of the largest and most modern stripping operations in the country.

Mr. Reid's outstanding ability in his chosen field was recognized throughout the industry.

Clyde Craggs, 56, chief engineer for U. S. Smelting Refining and Mining Co. for 15 years, died August 28.

Richard W. Parsons, until recently Technical Director of the Ohio Brass Co.'s main plant in Mansfield, Ohio, died on October 5 after a long illness.

A native of Mansfield, Mr. Parsons was educated at Ohio State University, graduating in 1925 with a bachelor's degree in Metallurgical Engineering. In 1927 he joined the Ohio Brass Co. as metallurgist and later was appointed Technical Director.

In this capacity he was responsible for the development of many technological improvements, including an improved method of annealing malleable iron castings in the company's new electric ovens.



Sixty teams from nine states competed in the First-Aid and Mine-Rescue contests

14th National First-Aid and Mine-Rescue Contest Held

WHILE the Yankees and Dodgers were battling it out in New York this fall, equally enthusiastic teams were competing for honors in another world series, the National First-Aid & Mine-Rescue Contest at Fort Wayne, Ind., on September 29, 30 and October 1.

After three days of activity-packed events, three teams emerged as victors in the safety meet:

Bergoo No. 4 coal mine of the Pardee & Curtin Lumber Co., Bergoo, W. Va., whose men took the first-aid contest;

Wisconsin No. 2 mine, International Harvester Co., Benham, Ky., whose representatives led all mine-rescue teams;

Mine No. 204, Consolidation Coal Co. of Kentucky, Jenkins, Ky., whose hard-working crew participated in both the first-aid and mine-rescue contest and took first honors in the combined events.

Staged in Fort Wayne's Memorial Coliseum, the contest drew a total of 60 teams, 47 in first aid and 13 in mine rescue. They came from Indiana, Illinois, Kentucky, Ohio, Pennsylvania, Tennessee, West Virginia, Wyoming and Maryland and represented the best in the country.

The mine-rescue contest, running from 8 a. m. to 8 p. m. the first day, saw teams working a tricky obstacle course which involved frequent tests

for gas and mine roof, installation of a brattice cloth stopping and rescue of a miner from behind a barricade. The course was so constructed by the U. S. Bureau of Mines that spectators and judges had unobstructed views. Each team, equipped with oxygen breathing apparatus, took about 45 minutes to run the course. Judges came from state mining departments and the U. S. Bureau of Mines.

The following two days were devoted to the equally exciting first-aid contest. Like the mine-rescue event,

it was held under auspices of the U. S. Bureau of Mines and the Joseph A. Holmes Safety Association and sponsored by The National Coal Association, United Mine Workers of America, and State Mining Departments. W. H. Tomlinson of the U. S. Bureau of Mines, Pittsburgh, Pa., was secretary of the entire three-day contest.

All of the first-aid teams worked simultaneous problems—11 in all. Three teams worked an additional problem to eliminate a tie.

Handsome prizes were awarded the



Bergoo No. 4 coal mine, Pardee & Curtin Lumber Co., Bergoo, W. Va., won the National First-Aid Contest. George Bonivich is team Captain. This team also won the West Virginia state championship for 1953

victors at a banquet following the first-aid contest. Speakers at the presentation included Howard T. Batman, general manager and counsel of the Lynch Coal Operators' Association, Terre Haute; George H. Deike, chairman of the board, Mine Safety Appliances Co., Pittsburgh; Percy Tetlow, assistant to John L. Lewis of the U.M.W.A.; and Tom Pickett, executive vice-president of the N.C.A., Washington.

Director J. J. Forbes of the Bureau of Mines addressed the competing teams along with Assistant Secretary of the Interior Felix Wormser, Mayor Harry W. Baals of Fort Wayne, and Indiana's Secretary of State Crawford W. Parker at welcoming ceremonies on Wednesday, September 30.

Following are other award winners in the national contest:

First Aid

- 2nd—National No. 3 mine, U. S. Steel Corp., Muse, Pa.
- 3rd—Kyle-Collier Mines, U. S. Steel Corp., Uniontown, Pa.
- 4th—Mine No. 214, Consolidation Coal Co. (Ky.), Jenkins, Ky.
- 5th—Group of mines (No. 1 team), U. S. Steel Corp, Gary, W. Va.
- 6th—Montour No. 10, Pittsburgh Coal Co., Library, Pa.
- 7th—Briar Creek mine, Crescent Coal Co., Central City, Ky.
- 8th—Jamison No. 11 mine, South Union Coal Co., Edna, W. Va.
- 9th—Pond Creek mine, Pond Creek Collieries, Williamson, W. Va. (mine actually in Kentucky).
- 10th—Mine No. 32, Consolidation Coal Co. (W. Va.), Fairmont, W. Va.
- 11th—Piney Fork No. 1 mine, Hanna Coal Co., Piney Fork, Ohio.
- 12th—No. 1 team Georgetown No. 12 mine, Hanna Coal Co., Adena, Ohio.
- 13th—Westland mine, Pittsburgh Coal Co., Westland, Pa.



Winner of the National Mine-Rescue Contest was this team from the Wisconsin No. 2 mine, International Harvester Co., Benham, Ky. Robert P. Hightower was team captain. The unit's trophies included the Congressional Medallion given by the U. S. Bureau of Mines



Wearing self-contained oxygen-breathing apparatus, a mine-rescue team examines "victims" of a simulated mine disaster while working a problem during the Mine-Rescue Contest

- 14th—St. Nicholas Central Breaker, Philadelphia & Reading Coal & Iron Co., St. Nicholas, Pa.

Mine Rescue

- 2nd—Hendrix mine, Consolidation Coal Co. (Ky.), Jenkins, Ky.

- 3rd—Stone Nos. 4 and 8 mines, Eastern Coal Corp., Stone, Ky.
- 4th—Wheelwright mine, Inland Steel Co., Wheelwright, Ky.
- 5th—Mine No. 204, Consolidation Coal Co. (Ky.), Jenkins, Ky.
- 6th—No. 40 mine, Peabody Coal Co., Galatia, Ill.

Combination Mine Rescue and First Aid

- 2nd—No. 2 team of Dun Glen No. 11 mine, Hanna Coal Co., Dun Glen, Ohio.
- 3rd—Jamison No. 9 mine, Jamison Coal & Coke Co., Farmington, W. Va.

This was the Fourteenth National Safety Contest since the first one in Pittsburgh, Pa., 42 years ago. They were inaugurated again two years ago with a contest in Columbus, Ohio, after a 20-year lapse. The 1953 contest was the second held in recent years and the pattern now seems to have been established for such an event every two years. First-Aid and Mine-Rescue training are an integral part of any mine safety program and nationwide competition helps develop enthusiasm in safety training.



Intent on their work, members of a first-aid team apply bandages and other remedial measures during one of the problems

NEWS

and VIEWS



Eastern and Central States



River Dock for Powhatan

Powhatan Mining Co. has made application to the U. S. Army Engineers, Pittsburgh district, for permission to construct five sheet steel pile cells and to dredge the right bank of the Ohio River at Powhatan Point, Ohio. Piling for the coal mine dock will extend along the western river shore for 555 ft and jut out into the river 70 ft.

New Coal Safety Code

A revised safety code for the bituminous coal and lignite mines of the United States has been issued by the U. S. Bureau of Mines.

Secretary of the Interior Douglas McKay advised that the revised code was endorsed and accepted by the United Mine Workers of America and the Bituminous Coal Operators Association. The Association represents a large portion of the soft coal production of the United States.

The new code supplements but does not supplant the Federal Coal Mine Safety Act (Public Law 552)* Title II of which is designed to prevent major coal mine disasters. Federal coal mine inspectors are now using the new code as a guide in their regular coal mine inspections.

Among the more important changes in the new code are those dealing with roof control. Since 1946, when the first code was published, many under-

ground coal mines have adopted roof bolting. The old code made no mention of roof bolting, but the 1953 code contains provisions for experimental installations in a mine before roof bolting is adopted as the means of roof support. Another change in the law outlaws the use of black powder underground instead of prescribing standards for its use.

The old code permitted booster fans to be installed underground under certain conditions, but the 1953 code entirely prohibits new installations of booster fans.

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* See "An Analysis of Public Law 552," by M. J. Ankeny, MINING CONGRESS JOURNAL, September 1953, p. 41.

NCA Meets in Washington

THE National Coal Association held its 36th Anniversary Convention at the Shoreham Hotel in Washington, D. C., on October 20 and 21. Several hundred coal mining men from all parts of the country heard addresses by prominent industry leaders, legislators and high government officials and each of the standing committees of the organization gave a report on the status of its work.

NCA President L. C. Campbell struck a note of optimism when he pointed out that the bituminous coal industry faces the most important era in its history, with a bright outlook for the long term. He stressed the point, however, that the public must be brought to a stronger realization of the importance of coal to the national economy and must understand why a strong coal industry is essential to a strong America. He promised a new and harder fight against unrestricted

law, to assist in strengthening and supporting the coal industry.

Representative Richard A. Simpson of Pennsylvania in speaking of the inroads on coal's traditional markets made by cheap foreign residual oil, promised formulation of a sane foreign trade policy.

Tom Pickett, executive vice-president of the National Coal Association, traced the history of the organization from its beginnings in 1917 by answering the questions: "Where have we been?"—"Where are we now?" and "Where do we go from here?"

In doing so he paid special tribute to the four men who preceded him as executive officers of the association. Three of them were present: J. D. A. Morrow, Joy Manufacturing Co.; Harry L. Gandy, Elk River Coal and Lumber Co.; and John D. Battle, of the National Coal Association. Car-

a Federal anti-trust suit filed against five major oil companies could have a significant effect on the future of bituminous coal. He also touched on several aspects of the natural gas storage problem and reviewed past legal developments affecting coal.

L. Russell Kelce, president, Sinclair Coal Co., and chairman of the NCA Land and Water Use Advisory Committee, reported on the recent decision of the Illinois Supreme Court, which declared unconstitutional and void, a zoning regulation intended to stop strip mining of coal. He also reported on field trips taken by members of the committee and action taken in support of mine water research by the Mellon Institute.

At a joint luncheon of the American Mining Congress Land and Water Use Technical Committee and the NCA Land and Water Use Advisory Committee, Miles P. Romney, Utah Mining Association, reported on the meeting of the Outdoor Writers Association of America in Missoula, Mont., and Henry Hebley, Pittsburgh Consolidation Coal Co., spoke on recent research advances with respect to the acid mine water problem. R. L. Ireland stressed the need for good representation from the mining industry at the coming meeting of Resources for the Future, Inc., in Washington, D. C., December 2, 3, and 4.

Dr. R. E. Snoberger's report on the activities of the Natural Resources Committee was read by Tom Pickett. L. E. Tierney, president, Eastern Coal Corp., presented the report of the Interstate and Foreign Commerce Committee. He predicted that offshore shipments this year may total 14,500,000 net tons with about 22,000,000 net tons going to Canada.

As usual, the Annual Dinner was a banner affair. Principal speaker of the evening was U. S. Senator Everett M. Dirksen, who spoke on the State of the Union. Edwin H. Davis, chairman of the Board, New York Coal Co., was toastmaster, and L. C. Campbell, president of National Coal Association, presided.

Mrs. Lillian Gildroy, president of the Bair Collins Coal Co., and mayor of Roundup, Mont., presided at the luncheon session on October 21. She is the first woman to wield the gavel on such an occasion. Guest speaker was Arthur Motley, whose subject was "Better Selling for Better Living."

Coal Mining Institute Meet

Sixty-Seventh Annual Meeting of the Coal Mining Institute of America will be held in Pittsburgh on December 10 and 11. Guest speaker at the Annual Banquet December 10 will be T. E. Purcell, general superintendent of power stations, Duquesne Light Co.



Interior Secretary Douglas McKay addresses coal men as J. D. Francis, president, Powellton Coal Co., and Tom Pickett, NCA executive vice-president, look on

imports of residual oil, when Congress reconvenes.

Campbell stated that the pattern of coal uses is changing but coal is not in retreat. The utilities and steel mills need more coal than ever and the coal chemicals industry has expanded greatly. Authoritative estimates place coal requirements of the power industry alone at 350,000,000 tons by 1975. All indications are that coal is passing into what may well prove to be an era more important than any in its past.

Interior Secretary Douglas McKay in addressing the convention recognized that no industry is of greater value to the United States and that few have so successfully met the type of problems which have plagued coal mining over the last three decades. He pledged his support, within the limits of his own authority and the

roll B. Huntress, the fourth man, is deceased.

Among the committee reports presented at the meeting was that of the association's marketing committee presented by Charles R. Griffith, president of the Southern Coal & Coke Co. His report dealt with sales engineering and activity in promotion of "off track" commercial and small industrial field.

The Mine Safety Committee reported that current government statistics reflect continued progress in coal mine accident prevention and that 1953 promises to be a record year for safety. S. Austin Caperton, president of the Slab Fork Coal Co., and chairman of the committee, read the report.

R. E. L. Hall, counsel for the National Coal Association, in a comprehensive report told the coal men that

Drillers Meet In Minn.

A Drilling Symposium, sponsored by the Center for Continuation Study, University of Minnesota, was held October 8-10 at the University in Minneapolis, Minn. A total of 107 persons registered for the three-day course. They represented exploration departments of mining firms, drilling contractors and manufacturers.

This was the Fifth Annual Meeting. The original Drilling Symposium was held in Duluth in 1949.

Reclaim Fume at Depue, Ill.

An electrostatic precipitator for the collection of fume from sintering, has been recently installed at the Depue, Ill., smelting operations of New Jersey Zinc Co. A rod curtain, horizontal flow type unit, the precipitator is designed to handle 32,000 cu ft of stack gases per minute. It operates at high tension voltages of 45,000 to 50,000 v. Two units have been installed and provision has been made for the installation of a third unit if required in the future. The present units operate an efficiency of 90 to 95 percent.

Fume entrapped by the precipitator is collected in bins beneath the pre-

cipitating chambers and withdrawn by an enclosed drag conveyor. This material is then calcined to increase its density. Fume, as collected, has a density of about 20 lb per cu ft as compared to 120 lb per cu ft after calcination.

Hebley Wins Nicholls Award

The Percy Nicholls Award for 1953, given in recognition of "outstanding achievement in the field of solid fuels,"



was presented October 29 to Henry F. Hebley, research consultant of Pittsburgh Consolidation Coal Co.

Presentation took place at the joint Chicago meeting of the Fuels Division of the American Society of Mechanical Engineers and the Coal Division of the American Institute of Mining and Metallurgical Engineers, which jointly sponsor the award.

The citation to Hebley honors him particularly for his "recent activities in the control and prevention of both air and stream pollution. . . ." His work in these fields was said to be "of outstanding value, both to his fellow engineers and to the public at large." He was also cited for important contributions to the technical knowledge of combustion and the preparation and sampling of coal.

Benson Capacity Up

It has been disclosed by the Jones & Laughlin Steel Corp.'s New York iron ore division that foundation work is 90 percent complete in a program that will expand annual output from 1,400,000 to 1,800,000 net tons of iron ore. There is a possibility that at least a portion of the scheduled production increase will be released in 1954. This all hinges on whether the foundations are finished this fall. The Nicholson Co., Inc., engineers and contractors, are building the new plant facilities.

The new program deals primarily with the expansion of the martite concentrating capacity at J. & L. Benson Mines works. Martite is now being extracted at the Star Lake, N. Y., property in commercial quantities following the successful experimentation and pilot plant operations. Magnetite, however, still represents the bulk of J. & L. Benson Mines production.

Because it is non-magnetic, a new method of concentration had to be devised for martite.

Vocational Committee Meets

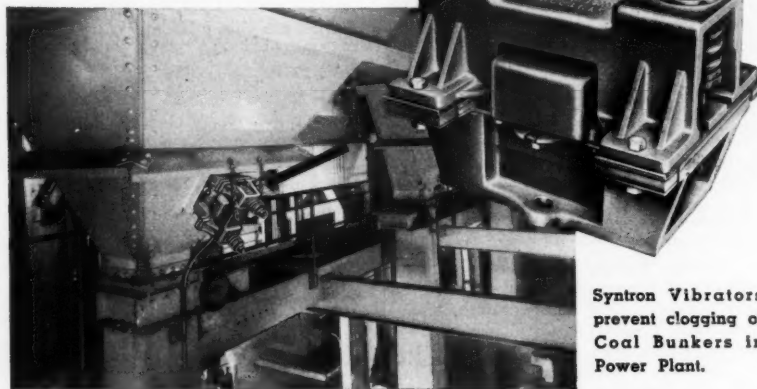
A meeting of the Vocational Training and Education Committee of National Coal Association was held at the University of Minnesota, Minneapolis, Minn., on October 9 and 10. Dean Thomas L. Joseph of the Institute of Technology, presided at a welcoming luncheon given the committee at Coffman Memorial Union on October 9. L. R. Lunden, treasurer and comptroller of the University, gave the welcoming address.

"Minnesota Taconite Developments" was the topic of a paper presented by Professor Edward W. Davis of the Mines Experiment Station. This was followed by a discussion of the engineering curricula at the University of Minnesota.

After a review of committee work, it was agreed that greater emphasis should be placed on the need of scholarships in the coal industry to attract young men to coal mining. Many other industries offer large numbers of scholarships and it was felt that the coal mining industry should not be left behind in this matter.

Next meeting of the committee will be held at the University of Alabama on January 15 and 16, 1954.

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Penn Mine Tests

An underground diamond drilling program is under way at the Penn copper-zinc-gold-silver mine of New Penn Mines, Inc., near Campo Seco, Calif. The company has signed an exploration contract with Defense Minerals Exploration Administration calling for financial assistance in the project. Drilling will be from the 1100-ft to 1400-ft level of the Penn No. 3 shaft to check geological structures in depth, according to reports.

New Penn is a subsidiary of Gold Fields American Development Co., which was formed to operate and develop the Penn mine in 1952. The mine is on the famed Mother Lode foothills copper belt and was first operated nearly 80 years ago as a copper mine.

Texas Phosphate Plant Ready

The Texas City Chemicals, Inc., placed its new \$7,000,000 three-purpose plant into operation on October 5 at Texas City, Tex. The plant will turn out 55,000 tons a year of feed-grade dicalcium phosphate and 15,000 tons of fertilizer grade dicalcium phosphate, 105,000 tons of sulphuric acid and 4000 tons of sodium silicofluoride. In addition to these products the plant will produce by-product uranium for the Atomic Energy Commission, being the second plant in the United States to recover uranium from phosphate rock mined in Florida.

Undergoing test operation for two months, the plant is expected to attain full operation in December.

The proximity of necessary raw materials needed by Texas City Chemicals, Inc., was one of the vital considerations in selecting Texas City as the site of the plant. Ocean-going barges will arrive once every ten days bringing an average of 300 tons of crushed phosphate rock mined from a strip operation near Tampa, Fla. On their return trip the barges will load up with sulphur at Galveston for delivery in Florida.

Between 90 and 100 tons of burnt lime will be brought in by rail each day from Round Rock, Tex., and molten sulphur will be trucked by tank truck from Texas Gulf Sulphur Co. and Jefferson Lake Sulphur Co. The International Salt Co. of Louisiana will barge through the Gulf Intracoastal Canal between 5000 and 6000 tons of salt a year from salt deposits on Avery Island. In order to bring the barges up to the Texas City plant, the canal from Texas City harbor had to be deepened.

The Texas City plant, from the standpoint of processing and economies involved, makes a significant contribution to the phosphate industry. It is one of two in the country that uses the wet process instead of the electric furnace process for manu-

facturing dicalcium phosphate. The process used at Texas City was invented by Warren R. Seyfried, who will become production manager of the plant as soon as it is in full operation. He is presently in the employ of Chemical Construction Co., builders of the plant, as development engineer.

They Also Serve

The Philadelphia and Reading Coal and Iron Co. was cited October 21 by the American Red Cross for its second consecutive year of 100 percent employee participation of P & R's Philadelphia office in the organization's blood program.

Howard Price, vice-president and secretary, accepted a second star for the 100 percent donor flag the firm received last year, the first business or industry in the United States to be so honored.

Organized in 1950, the firm's Ralph E. Taggart Memorial Blood Bank, named in memory of a former president of the company, has received outstanding support from employees. Within the past year, employees of the Philadelphia, Pa., office have donated 146 pints of blood. In 1952, they donated 125 pints and 104 pints were given in 1951.

DIESEL ENGINES

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Six Cylinders—Shorter Base—Electric Starter—Power-Take-Off-Clutch. Available with or without Stub Shaft and Out-board Bearing.

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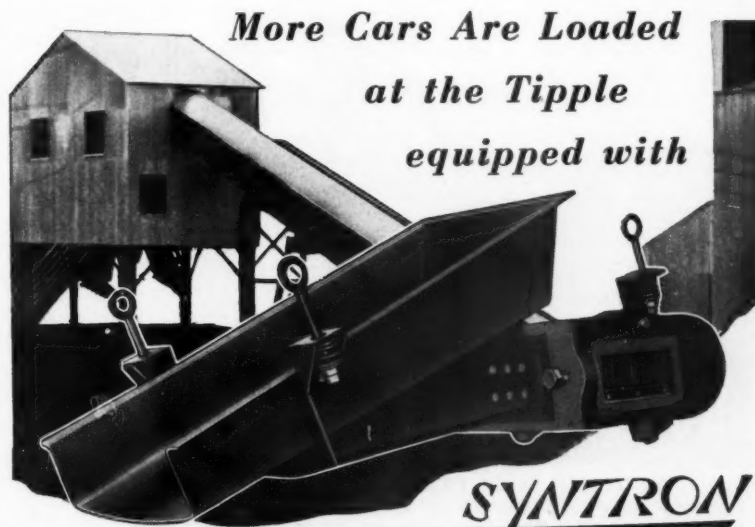
440 Beaumont Ave., Montreal, Que.

Study Titanium Plant

Monsanto Chemical Co., St. Louis, and National Research Corp., Cambridge, Mass., have announced they are holding discussions with the General Services Administration in Washington, D. C., concerning a government loan for constructing a plant for the production of low-cost titanium.

The two organizations have been engaged for several years in a joint research project directed toward the development of processes for the low-cost production of titanium metal.

No further details are available at the present time.



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Peabody Leaves Chicago

Peabody Coal Co. is moving its principal offices from Chicago to Taylorville, Ill. In the move, to become effective about January 1, Peabody's general accounting, sales order and analysis, traffic, engineering, purchasing and operating departments will be moved. The executive and general sales offices will remain in Chicago.

Made in the interest of greater efficiency, the move will place the transferred offices close to the larger part of the Peabody mining operations which are located near Taylorville.

Stonega and Safety

On April 27, 1953, all of the employees of the Crossbrook Colliery, Stonega Coke and Coal Co., completed the U. S. Bureau of Mines Accident Prevention Course for Miners. Shortly thereafter, on August 15, all employees at the Derby colliery completed the same course. This, of course, qualified the Crossbrook and Derby collieries and the local unions at these collieries to receive 100 percent certificates from the U. S. Bureau of Mines; the local unions received a certificate from the United Mine Workers of America.

A meeting was held at Derby, Va., on October 3 to present the certificates. The afternoon was marked by presentation ceremonies, drawings for cash prizes, and refreshments furnished by the Stonega Coke and Coal Co.

See Early Iron Ore Production

According to a newspaper item, Bethlehem Mines Corp., Bethlehem Steel Co. subsidiary, now sees the possibility of iron ore production from its Marmora, Ont., property by next fall. Earlier predictions had been that production would not begin before 1955.

Proposed production from the big Marmora deposit is 1,000,000 tons per year. Stripping has been stepped up and the ore body is expected to be uncovered in one portion of the pit soon.

Canadian Turner Construction Co., Ltd., subsidiary of the American firm of the same name, has been granted a general contract for construction of a milling plant at Marmora. When in production, concentrates will be shipped to Picton, 55 miles away on the shore of Lake Ontario. From Picton they will be taken by lake carrier to U. S. ports.

Fairview Collieries Expands

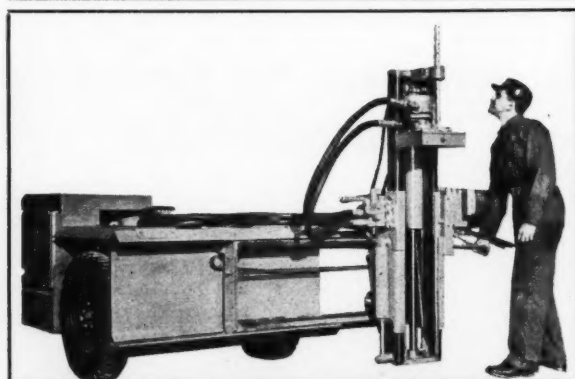
Fairview Collieries Corp. has purchased all of the physical properties of the Hickory Grove Coal Mining Corp. and the little Betty Mining Corp. Both of these properties are located at Linton, Ind.

The transaction was completed on October 1. Fairview will continue to operate the mines under the trade name of Minnehaha, with Republic Coal and Coke Co. continuing as exclusive sales agent.

New Washer at Robena

When the new addition to the present coal cleaning plant at U. S. Steel's Robena Mine near Uniontown, Pa., is completed, the washing capacity at the mine will be increased to approximately 24,000 tpd. The new addition is to be housed in a ten-story structure located next to the present preparation plant and is expected to be in full operation by the end of this year.

Like the original plant, the new washer uses cones and tables for cleaning the coal. The plant is expected to operate on a 24-hour basis with a five-day week schedule.



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Western States

Honor Anaconda's Kelley

A new name has been added to the Great Northern Railroad's main line through Montana. The new rail site is a siding for the construction of a multi-million dollar aluminum plant and will henceforth be known as Conkelley. It was formerly called Brent.

The naming honors Cornelius F. Kelley, chairman of the Board of Directors of the Anaconda Copper Mining Co. The site is two miles east of Columbia Falls, Mont., where the Anaconda Aluminum Co., a subsidiary of the copper firm, is building an aluminum plant.

Kaiser's Natividad Mine

The Kaiser Aluminum & Chemical Corp. has established two additional benches at its open pit Natividad dolomite plant near Salinas, Calif. The new benches give the company more than a mile of working face. Established at the 812- and 850-ft levels, they are reached by two new access roads which have been built to handle all trucks and heavy equipment. The roads lead to the open pit's 700-ft level where dolomite will be dumped in the primary jaw crusher and conveyed to the Heavy Media Separation plant for treatment. This plant upgrades the dolomite for further treatment in the corporation's limestone and dolomite plants.

Kennecott Renovates Molybdenum Mill

The Utah Copper Division, Kennecott Copper Corp., is currently undertaking a large mill renovation program aimed at upping molybdenum production. The firm also hopes to increase copper production slightly by changes and additions being made in flotation machinery at its huge Arthur and Magna concentrators. Installation of the new flotation cells at the Arthur mill, is about finished and modernization of the electrical system to serve both mills will be finished this fall.

Work on cells at the Magna mill, commenced some months ago, should be completed sometime in the spring. All the changes at the concentrators are being carried out without inter-

ruption to operations. Officials point out that the projects amount to a re-processing of present mill tailings by either new or additional flotation equipment. The increases in molybdenum and copper output are expected as a result of the improvements. It was added that several years of research work in the company's laboratories and testing in the mills themselves preceded the major modeling job.

At the Arthur mill, the old 56-in. cells have been replaced with 720 62-in. Fagergren cells in rows of 16 units each. At Magna, the present 56 rows, comprising a total of 640 cells, will be left intact and a series of cells added to the end of each row to re-treat the tailings. Officials said the project also entailed construction of an additional roaster at the Arthur plant to handle recovery of molybdenum.

New U-Ore Laboratories

United States Vanadium Co. will start construction soon on two new installations at its Rifle and Uravean, Colo., uranium ore processing plants.

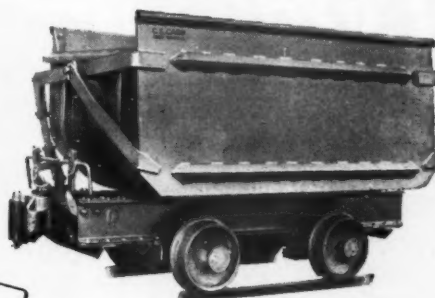
One laboratory, exclusively for experimental studies in the development of newer methods of refining uranium and vanadium ores will be erected close to the company's plant at Rifle, Colo. The other for analytical work in conjunction with the company's Uravean operations, will be built beside USV's huge Uravean mill, the largest uranium processing mill in the United States.

Tyson Reports Chrome Find

Discovery of a high-grade chrome deposit in a virgin section of the Tyson mine at French Hill near Crescent City, Calif., has been confirmed by Harold Wooley, lessee of the property from Ben Mickle Mining Properties. He reports an extensive development program is planned, following reconditioning of old workings.

First operated in the 1880's by Tyson Mining Co. chromite from the mine was shipped via Cape Horn to the company's Baltimore plant. The mine was operated on a large scale during both World Wars. Wooley reports the new deposit is the largest uncovered in many years in the Tyson and the outlook is favorable for substantial production.

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Wheels of Government

(Continued from page 106)

group is expected to complete its study and report its findings to the Secretary by December 20.

Members of the team include: Floyd Hart, president and general manager, Timber Products Co., Medford, Ore., chairman; Philip D. MacBride, lawyer, Seattle, Wash., Paul Hunt, consulting engineer, United Park City Mines Co., Salt Lake City, Utah. Three Department of the Interior officials complete the team.

Long Wall Mining

(Continued from page 33)

5000 tons from a three-ft seam. This estimate is a very conservative one considering daily tonnages of 700 to 800 tons per shift of only a 329-ft longwall length at the first experimental planer face at Helen.

The manifold advantages resulting from this highly concentrated and productive mining system are:

- (1) High production per man-shift
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- (5) Simple, effective ventilation
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- (8) Dustless operation of planer mining
- (9) Low power consumption
- (10) Low maintenance costs
- (11) Low initial investment

What has been done in the Ruhr should, and could, be done still better in the United States.

It is therefore a great satisfaction in this dark hour of low-seam mining here to see a silver lining in the clouds over the horizon.

Open New Coal Mine

The Gunn-Quealy Coal Co. has announced the opening of a new coal mine at its field at Quealy, five miles southwest of Rock Springs, to be known as the Rainbow No. 3. It will employ about 50 persons and produce about 1000 tons of coal daily and will be ready for operation about the middle of September. It will be completely mechanized and is on the same field with other strip-mining operations of the firm.



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Sell Phosphate Lease

W. H. H. Cranmer and John Archer, Salt Lake City, announced the sale of a Utah state phosphate lease at Rex Peak, Rich County, to J. R. Simplot of Boise and Pocatello, Idaho. They reported that Simplot had granted them a 10 percent over-riding royalty on acid grade rock and a five percent royalty on electric furnace grade rock. The two men share a 50 percent interest in the lease.

Extend U-Ore Bonus Plan

Extension of the guaranteed minimum price schedule and also the bonus payment program for the uranium ores of the Colorado Plateau area was announced on September 23 by the AEC. The new expiration date for the guaranteed minimum price schedule is March 31, 1962. The price schedule ranges from \$1.50 to \$3.50 per pound of uranium oxide content, depending upon the grade of the ore, together with certain allowances for development and haulages, and premiums for vanadium.

The bonus program for initial and certain other production of uranium ores from domestic mines has been extended to February 28, 1957. Bonus payments are made to new mines for each pound of uranium oxide in acceptable ores delivered to qualified

mills or AEC ore-buying stations up to and including the first 10,000 lb of U_3O_8 . For eligible mining properties which produced less than 10,000 lb between April 9, 1948, and March 1, 1951, bonus payments are made on the difference between 10,000 lb and the number of pounds sold between the earlier dates.

The Commission said bonus payments range from \$1.50 to \$3.50 per pound of uranium oxide in acceptable ores produced from eligible properties, depending upon the grade of the ore. Maximum bonus which may be obtained from the production of new mines ranges from \$15,000 to \$35,000 depending upon the grade of the ores delivered.

New Sampling Plant

Completion of a mechanical sampling plant at the manganese ore purchasing depot at Deming, N. M., has been announced by Otto G. Klein, regional director of the General Service Administration.

To Drill Near Marysvale

John W. Wilhelm, president of Deer Trail Mines, Marysvale, Utah, reports that a diamond core drilling campaign is to be conducted by the firm operating its own equipment in a lead area, where uranium minerals were found in 1952.

Abandon Perlite Quarry

The Henry J. Kaiser Co. has abandoned a perlite quarry and plant 13 miles south of Maupin, Ore., according to the owner, Dant & Russell, Inc., of Portland. The operation was shut down early in June and 65 employees of the Kaiser Gypsum division were dismissed. Kaiser Gypsum announced early in 1952 that it was leasing the operation from Dant & Russell for one year, with an option to buy.

Manganese In Wyoming

Ignatz Piki, veteran Lincoln County prospector, reported at Kemmerer, Wyo., the discovery of manganese-bearing ore in the north area on the Fontenelle. A report from the Natural Resources Research Institute at Laramie indicates a good grade.

Meadow Valley Gold Mine

Ontop mine in Meadow Valley, near Quincy, Calif., is being reopened by H. E. Fowler. The mine has not been operated since World War II. A new access road has been built to the mine, foundations for new surface buildings completed, and an air compressor installed. A limited exploration program is scheduled for this summer, with more extensive work planned next year.



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Silver Reef Tested

Good to high grade uranium ore has been revealed by several of the 75 core drill holes on Western Gold and Uranium, Inc.'s Silver Reef property located at Leeds, Utah. Under the drilling program, sponsored by the Atomic Energy Commission, some 300 exploratory holes will be sunk. Ralph G. Brown, president and director, reported that a mill would be warranted if favorable results continue over the three remaining months of the programmed drilling.

Electric Smelter for Cominco

The world's largest induction furnace for melting zinc sheets has been placed in operation by Consolidated Mining and Smelting Co. of Canada, Ltd., at its Trail, B. C., plant. Designed and constructed in Italy to meet Cominco needs, the furnace is said to be the first of its kind to be used in the western hemisphere. It is rated at about 300 tons of zinc per day.

Until recently, all zinc sheets at the plant were melted in oil-fired reverberatory furnaces. Large volumes of flue gas carrying zinc oxide from these furnaces has to be treated to recover metal values. Very little gas is generated in the new furnace, and

working conditions are expected to be improved.

The furnace is an induction type unit with channels of molten zinc acting as secondary coils of transformers. The circulation of molten zinc melts incoming zinc sheets, which are charged through four ports on top of the furnace.

Building Tungsten Plant

Toiyabe Mining and Milling Co. is rushing construction of a tungsten concentrator at Gabbs, Nev., designed to treat 50 tpd. Scheduled to go into operation in November, it will operate on scheelite from the Big Top mine, operated by J. H. Baxter and Thomas Hancock. Ore will be hauled 28 miles to Gabbs from the property, which has produced a lot of scheelite since its discovery last fall.

Build AEC Repair Shop

Sheldon P. Wimpfen, manager of the Grand Junction, Colo., Operations Office, U. S. Atomic Energy Commission, announced that a new repair and maintenance shop will be constructed at the Commission's headquarters in Grand Junction. Bids for the construction were received September 25, 1953, by Walker-Lybarger Construction Co., prime contractor for the Commission.

Six contractors submitted bids for construction of the new shops and Prothero and Boardman of Provo, Utah, the low bidder, has been issued notice to proceed with construction. Bids ranged from a low of \$177,800 to a high of \$212,000.

Construction of the new shops at the Commission's Grand Junction Compound will provide new facilities for repair and maintenance work which has increased under the Commission's expanding program for procurement of domestic raw materials.

Colo. Coal Mine Production Up

Production of coal at the Colorado Fuel and Iron Corp.'s new Allen Mine, near Stonewall, Colo., is now at an all-time high, according to A. F. Franz, president of Colorado Fuel and Iron.

Approximately 40,000 tons of coal are now being produced monthly. This coking coal is one of the major factors behind the expansion of operations at CF&I's nearby Pueblo, Colo., fully-integrated steel mill, which now produces about 60 percent of the corporation's annual output.

Coal production started from the west portal of the Allen mine last year and from the east portal earlier this year. The mine is expected to become one of the largest coal producers in the Rocky Mountain area in years to come.

FOR SALE

One Worthington Elevator Pump, serial #877407, 4" suction, 3" discharge, 525 lb. head, 250 GPM, 158 HP, 3670 RPM, 10" impeller, test pressure 1000 lbs., with Westinghouse reduction gear, serial #1994, pinion RPM 3670, gear RPM 1260, normal rating 158 HP, unused.

MARINE ELECTRIC CO.

2121 N. W. Thurman St., Portland, Ore.
BRoadway 6447

Cement Co. Expands

Work has been started by the Oregon Portland Cement Co. to modernize its Lime, Ore., plant and increase capacity. This is the first step in an expansion project by the company designed to provide cement for the Snake River dams now under consideration.

Dodge Ships Ore

Dodge Construction Co. has completed shipment of 44 carloads of high-grade iron ore from its open-pit mine south of Lovelock, Nev., to the U. S. Government. The shipments were destined for a government installation in the state of Washington. The company has completed several diamond drill holes at the mine to check ore continuity and grade in depth. Cores from some of these holes have reportedly shown continuous ore from the surface to a depth of 120 ft.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

OF THE MINING CONGRESS JOURNAL, published monthly at Washington, D. C., for October 1, 1953.

City of Washington, District of Columbia, ss:

Before me, a notary public in and for the state and county aforesaid, personally appeared John C. Fox, who, having been duly sworn according to law, deposes and says that he is the Editor of THE MINING CONGRESS JOURNAL, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in Section 537, Postal Laws and Regulations, printed on the reverse side of this form, to wit:

1. That the names and addresses of the publisher, editor and business manager are:

Name of publisher, The American Mining Congress, Washington, D. C.

Editor, John Cameron Fox, Washington, D. C.

Business manager, P. D. McMurrer, Washington, D. C.

2. That the owners are: The American Mining Congress—a corporation, not for profit. No stockholders. President, Howard I. Young, St. Louis, Mo.; Executive Vice-President and Secretary, Julian D. Conover, Washington, D. C.

3. That the known bondholders, mortgages, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: None.

JOHN C. FOX,

Editor.

Sworn to and subscribed before me this 20th day of October, 1953.

KATHRYN A. HATHAWAY,

Notary Public.

(My commission expires July 31, 1957.)

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Drill Copper King

Harry Ferguson, president of the Copper King, Inc., said that core tests this spring at the Copper King Mine, 22 miles west of Cheyenne, Wyo., indicate an estimated 10,000,000 tons of available ore. A total of 2335 ft were drilled by the Colorado Assay Co., Denver. Ferguson said his figures are based on reports by this firm.

Mouat Produces Again

The Mouat chrome mine near Nye, Mont., reportedly able to supply up to 25 percent of this country's chrome requirements, is in production again. More than two years were spent in rehabilitating the property.

Owned by American Chrome Co., a subsidiary of Goldfield Consolidated, Inc., the mine is currently producing about 500 tpd of ore and expects to reach an annual output of 300,000 tons.

Present production comes from old workings above the No. 5 adit tunnel and is delivered to the mill by aerial tramway. There are five upper levels, all connected by raises and openings on the ore body, which consists of hangingwall streaks and a 5 to 11-in. wide footwall seam.

Plans for future development include driving a mill level adit which

will gain about 1700 ft of depth on the ore body and permit direct track haulage to the mill.

The venture represents the second attempt at large-scale production from the Mouat mine and it is being done under a contract with the government which provides that the company will produce 900,000 tons of specified grade chrome concentrates by December 31, 1961, at the rate of about 114,000 tons annually.

The property was originally located before the turn of the century as a copper-nickel prospect but the copper-nickel ore was too low grade for successful operation.

World's Highest Coal Mine

High in the sometimes cloud-hidden peaks of the Canadian Rockies is a coal which is claimed to be the highest in the world. Operated by Coleman Collieries Limited of Coleman, Alberta, Can., it is 7400 ft up on the peak of Tent Mountain.

The coal deposits were reached by carving a road out of the mountain-side with bulldozers and motor graders. Motor graders regularly patrol the access road with its multiplicity of switchbacks, to maintain the route for coal trucks, operating year-round despite the perilously icy conditions which often prevail during winter

LOST AND FOUND AT SEATTLE

A "Pioneers in Service and Engineering" 25-year service pin was found in the Olympic Hotel during the recent American Mining Congress there. If any of our readers know who might have lost such a pin, or have any other information that would assist in locating the owner, we would appreciate hearing from them. Drop a line to Mining Congress Journal, 1102 Ring Bldg., Washington 6, D. C.

months. Testifying to the skill of the drivers, no deaths have occurred on the steep, winding access road.

A Caterpillar D7 bulldozer is used to remove overburden which is dumped over the edge of a mountain valley.

Although temperatures plunge to far below zero during winter, the equipment is operated around the clock and only on exceedingly cold and stormy days do operations come to a standstill.

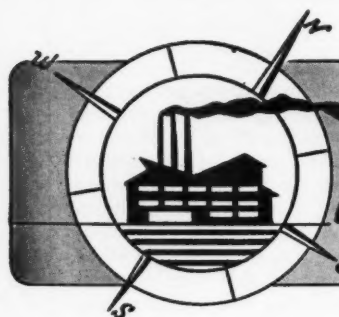
Union Pacific Coal Mines Win Safety Honors Again



Stansbury No. 3 Seam miners worked 442,880 man-hours without a lost-time injury during 1952



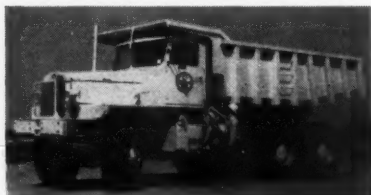
Reliance No. 7 Miners completed their fifth year without a lost-time injury accumulating 2,055,131 man-hours



Manufacturers Forum

Trucks for Orinoco

Orinoco Mining Co., a subsidiary of the United States Steel Corp., will begin operations of mining and hauling out iron ore from Cerro Bolivar, Venezuela, in January, 1954. Its property is an isolated mountain containing high grade ore deposits, and Orinoco will bring the myth to reality by "moving the mountain." To aid in accomplishing this herculean task, 16



Model LRSW, 20-cu yd off-highway dump trucks were ordered from the Mack Truck Co. These will carry 35 tons of ore per load down the mountain side to a railhead.

Eight of the trucks were shipped in September and eight in October. Each truck is powered by a 300-hp Cummins diesel engine. To cope with the eight percent grades, when running down hill under load, Twin Disc Converters and Parkersburg Hydro-tarders are included in the special equipment features of the trucks.

Prolong Air Tool Life

Especially designed to meet all air tool lubrication requirements, the new Wright Oiler features a patented wick filter which prevents clogging and



completely atomizes the oil for better lubrication. In addition, its oil metering valve cannot vibrate shut.

It can be attached directly to any pneumatic tool and provides a steady,

regulated oil flow in all positions: normal, upside down, or on either side, according to the manufacturers.

Further details and the name of your nearest supplier can be had from the Wright Power Saw and Tool Corp., 292 Longbrook Ave., Stratford, Conn.

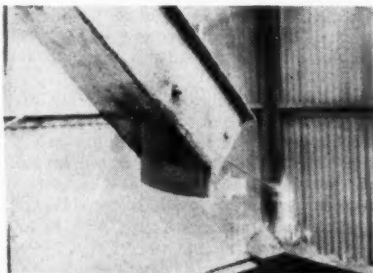
Easier Conveying

A newly developed pneumatic conveyor, the Vacuveyor, is being manufactured by the Vacu-Blast Co., Inc. The manufacturer reports that the conveyor will move up to 40,000 lb per hour and will convey material up to 150 ft vertically and 250 ft horizontally. It is designed to convey any dry, bulk powders, grains, pellets or crystals. Materials that can be conveyed by the pneumatic system successfully include sands, cement, salts, coal, gypsum and bauxite.

Complete information can be had from the company at Box 885-R, Belmont, Calif.

Reduce Abrasion Wear

"Iron-Rubber" sheets are the latest addition to the product line of the Magic Chemical Co., Brockton, Mass.



The sheets are designed to combat abrasion and corrosion.

Complete details and prices may be obtained by writing Mr. Louis Leaman, Magic Chemical Co., Dept. No. 98, 121 Crescent St., Brockton, Mass.

Enters Heavy Machinery Field

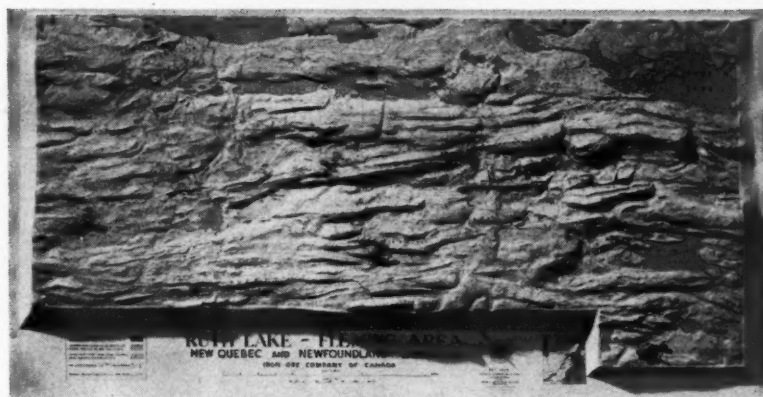


The Eimco Corp. announces its entry into a new field of heavy machinery with its Eimco 105 which is basically a new heavy prime mover available with its own excavating attachment and other tools.

The 105 is considerably heavier than their previous large model (weighs

approximately 34,000 lb complete with loader) and has numerous design and operating improvements. The most important of these is Eimco's new Unidrive Transmission, containing, in one compact unit, all of the gearing and clutches for speed changing and full independent reversal of each track.

Relief Maps With Relief



Management planning for the Iron Ore Co. of Canada's development in Labrador will be aided by new relief maps of the Ruth Lake-Fleming area. These new maps, formed in durable, lightweight plastic, were produced by Aero Service Corp., Philadelphia. Basic topographic information was taken from aerial maps of the area compiled by Canadian Aero Service, Ltd. of Ottawa.

These striking new relief maps show both the topographic situation and the geologic picture for the area. They were lithographed in three colors to

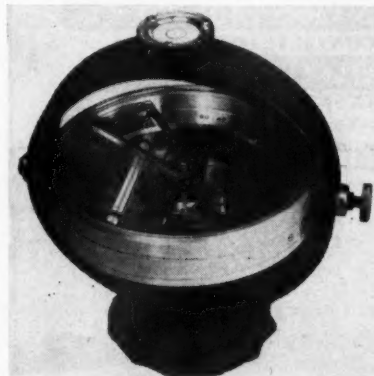
show geologic data provided by the iron ore company's geologists, then formed in Vinylite plastic. The map is 58 in. wide by 31 in. deep, and weighs only 1½ lb. Its scale is 1 in. equals 1000 ft, and its vertical exaggeration (to emphasize the relief character) is 2 to 1.

With the maps the company management can plan for this big new mining facility. With a relief model, terrain problems stand out clearly for the men of diverse backgrounds and interests who comprise most boards of directors.

Find That Anomaly

The Radiac Co., Inc., 489 Fifth Ave., New York 17, N. Y., announces the availability of the Sharpe D1-M Magnetometer.

The D1-M Magnetometer features simplicity of operation and light



weight (five lb), combined with high sensitivity and accuracy under most rugged field conditions. The use of new magnetic alloys insures a maximum sensitivity of 70 gammas per scale division. On swing readings the normal sensitivity is 30 gammas per scale division. The scale value sensitivity can be easily adjusted in the field.

—Announcements—

Jet-Lube, Inc., of Los Angeles announced the appointment of Hugh R. Wagenen as consultant of their Mining Division.

Milton B. Beach has been elected president and general manager, and John P. Ramsey vice-president and sales manager of Flexible Steel Lacing Co.

Completion of a new building at 1326 N. 22nd Ave., Phoenix, Ariz., to accommodate its expanded southwest sales offices and warehouse stocks has been announced by Copco Pacific Ltd.

Establishment of a Nordberg District Office in St. Louis, Mo., was announced by D. A. Cheyette, vice-president, Crusher, Screen and Process Machinery Division, Nordberg Manufacturing Co., Milwaukee, Wis. Located at 3300 South Second Street, the New South Central office will serve crusher, screen and process machinery customers in the South Central and Suothwestern States.

Cardox Corp. recently announced the appointment of Richard J. Bailey as chief engineer of the Mining Division and Dallas P. Graham as chief design engineer of Mining Equipment. Bailey was formerly the engineer in

charge of Airdox Equipment. For the past two years, Graham has been in charge of the design of Cardox-Hardsoeg drilling equipment.

Headquarters of R. G. LeTourneau, Inc., have been transferred from Peoria, Ill., to Longview, Tex.

H. M. McDaniel has joined the sales staff of Republic Steel Corp.'s pipe division to supervise the sale of plastic pipe and tubing, a field entered by Republic in June.

Paul D. Sullivan has been named manager of Contractor Sales for the Construction and Mining Division of Le Roi Co. Sullivan will be responsible for Le Roi sales to large contractors throughout the continental United States.

CATALOGS AND BULLETINS

COAL CLEANING. *The Dorr Co., Barru Place, Stamford, Conn.* Bulletin No. 7100 describes Dorr equipment units which have a useful place in coal cleaning plants. Their uses are described by photographs, size and capacity ratings, applications, and in typical plant flow-sheets.

DIAMOND DRILL BITS. *Anton Smit & Co., Inc., 333 West 52nd St., New York 19, N. Y.* Of file size and tab indexed for the users' convenience, this booklet contains information about latest developments in diamond drill bit products. It may be had by writing Department MCJ at the above address.

ELECTRONIC CONTROLS. *Photo-switch, Inc., 77 Broadway, Cambridge 42, Mass.* A handbook that contains 46 case histories explaining how standard electronic controls have solved problems of weighing, counting, measuring, timing and cycling. Available free of charge at the above address.

EFFICIENT CRUSHER APPLICATIONS. *Pennsylvania Crusher Co., Liberty Trust Bldg., Philadelphia 7, Pa.* The booklet gives information on how to make the most efficient and satisfactory application of various types of crushers to specific jobs. All important factors are discussed in detail. Will be sent free of charge to anyone sending in a request on company letterhead.

HEAT DRYING COAL. *Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill.* Book No. 2466 describes performance records of the Link-Belt Multi-Louvre dryer in heat drying coal. Nine case histories are included as is a review of basic requirements for heat drying coal successfully.

IRON ORE BENEFICIATION. *Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.* Booklet B-5858 contains 20 pages describing the application of electric power to iron-ore beneficiation projects. Types of electrical equipment and systems best suited for each step in mining and processing ore are described. Write to the above address.

WINCHES AND CAR PULLERS. *Stephens-Adamson Mfg. Co., Aurora, Ill.* Bulletin 853 describes SA hand and motor winches while Bulletin 753 describes their line of car pullers.

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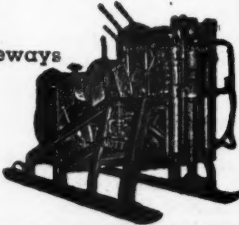
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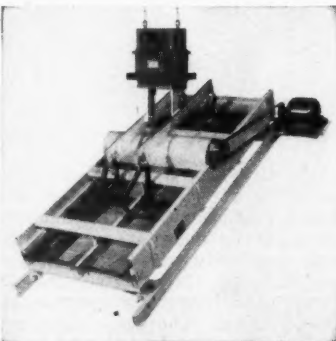
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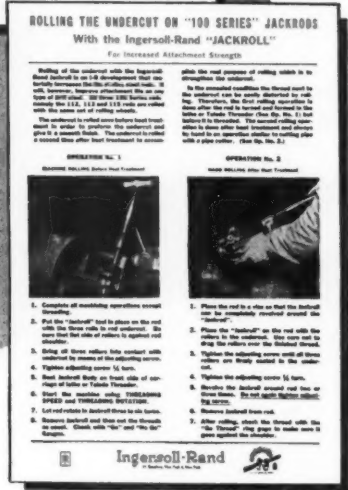
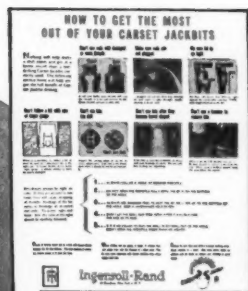
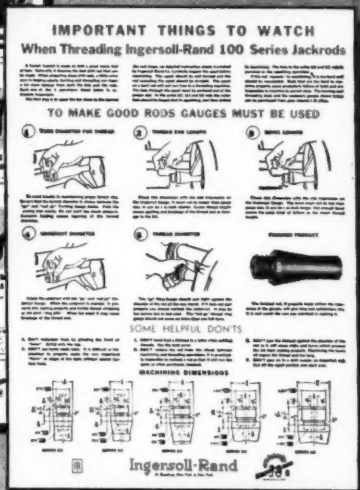
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☐ Using Carset Jackbits, Form 4122

☐ Threading Jackrods, Form 4112

☐ Rolling the Undercut, Form 4120

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Company

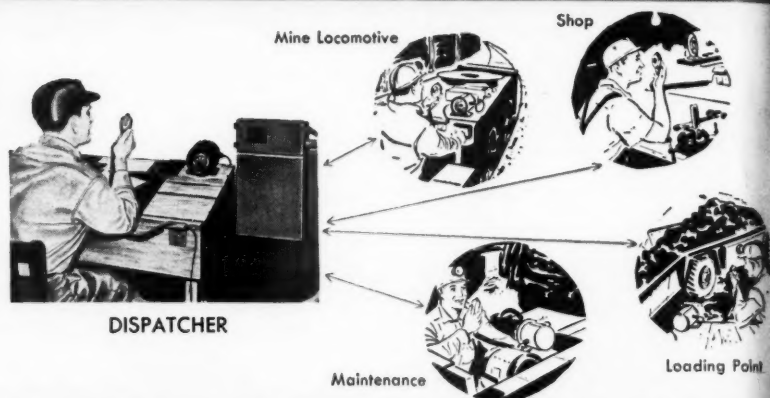
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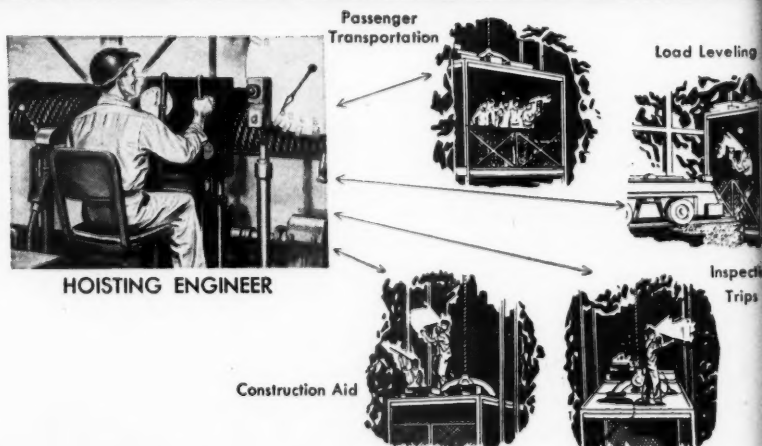
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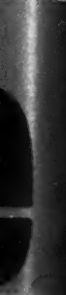
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